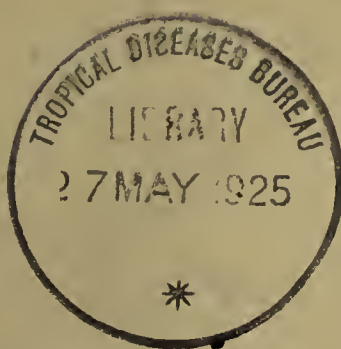


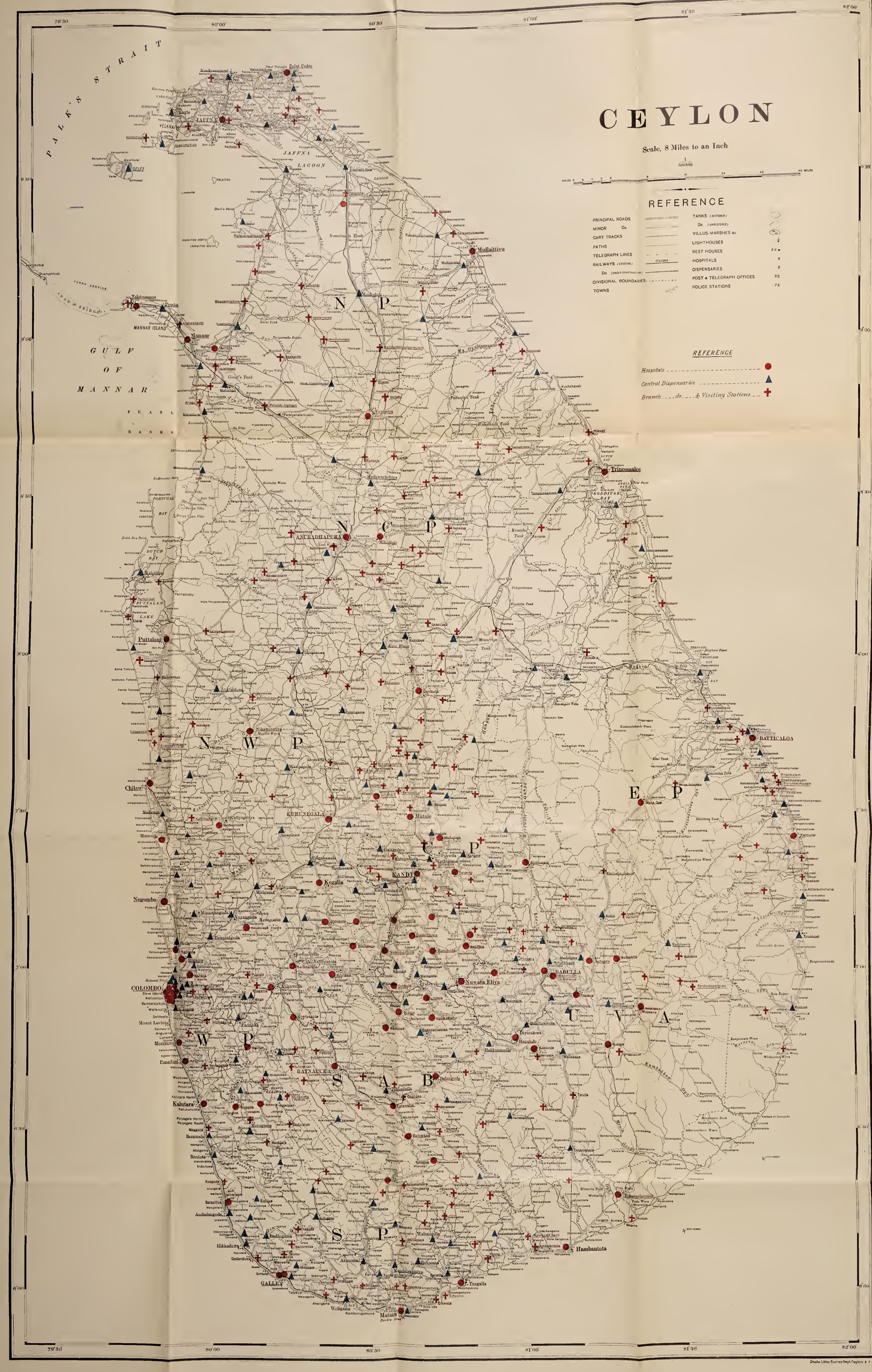
10/10-11, 12-13, 14, 15, 16, 18, 19, 23
Medical Reports

Ceylon

✓ 495



Report for Year 1923



CEYLON

Scale, 8 Miles to an Inch

REFERENCE

- | | | |
|-------------------------|-----------------|--------------------------|
| PRINCIPAL ROADS | Do (unimproved) | TANKS (RESERVOIRS) |
| MINOR | Do | Do (unimproved) |
| CART TRACKS | | VILLUS, MARSHES &c |
| PATHS | | LIGHTHOUSES |
| TELEGRAPH LINES | | REST HOUSES |
| RAILWAYS (EXISTING) | | HOSPITALS |
| Do (UNDER CONSTRUCTION) | | DISPENSARIES |
| DIVISIONAL BOUNDARIES | | POST & TELEGRAPH OFFICES |
| TOWNS | | POLICE STATIONS |

REFERENCE

- | | |
|-------------------------------|--|
| Hospitals | |
| Central Dispensaries | |
| Branch do & Visiting Stations | |

MEDICAL.

REPORT OF THE PRINCIPAL CIVIL MEDICAL OFFICER AND INSPECTOR-GENERAL
OF HOSPITALS FOR THE YEAR 1923.

TABLE OF CONTENTS.

Sub-section.	PAGE	Sub-section.	PAGE	Sub-section.	PAGE
SECTION I.—ADMINISTRATION.				SECTION VI.—MISCELLANEOUS.	
2 Staff	1	Ragama Hospital for Chronic Cases	13	41 King Edward VII. (Memorial) Anti-Tuberculosis Fund ..	25
3 Promotions and Appointments	1	24 Leprosy	13	42 The Ceylon Medical College ..	27
4 Officers on Leave	2	25 Parangi	13	43 Civil Medical Stores	27
5 Financial	2	26 Plague	14	44 Opium	27
SECTION II.—POPULATION : PUBLIC HEALTH.				SECTION VII.—SCIENTIFIC.	
6 Estimated Population	2	SECTION III.—THE SANITARY BRANCH OF THE MEDICAL DEPARTMENT.		49 Government Bacteriological and Pasteur Institutes ..	31
7 Vital Statistics	2	28 Report submitted by the Sanitary Commissioner ..	14	50 Intravenous Protein Therapy in Septic Polyarthritis ..	37
8 Causation of Deaths	2	SECTION IV.—METEOROLOGY.		51 Investigations on the Control of Hookworm Disease—Larval Activities ..	37
9 Notable Causes of Deaths	2	29 Rainfall	21	52 The Value of Insulin in Diabitis Mellitus ..	39
10 Infantile Mortality	2	30 Temperature	22	53 Splenectomy	40
11 Vital Statistics on Estates	2	SECTION V.—HOSPITALS, ASYLUMS, AND DISPENSARIES.			
12 Malaria	3	31 Number of Institutions and Number of Beds available for In-patients ..	22		
Report of the Malariologist ..	3	32 General Hospital, Colombo ..	22		
13 Cholera	7	33 Lunatic Asylum, Colombo ..	23		
14 Smallpox	7	34 De Soysa Lying-in Home ..	24		
15 Vaccination	7	35 The Victoria Memorial Eye Hospital and the Grenier Ear, Nose, and Throat Infirmary ..	24		
16 Government Vaccine Establishment	7	36 The Lady Havelock Hospital for Women and The Lady Ridgeway Hospital for Children ..	24		
17 Enteric Fever	7				
18 Diphtheria	8				
19 Influenza	8				
20 Dysentery	8				
21 Cancer and Sarcoma	8				
22 Anchylostomiasis	9				
Anchylostomiasis Campaigns ..	9				
23 Tubercular Disease of the Lungs	12				
Anti-Tuberculosis Institute, Colombo	13				
Kandana Sanatorium	13				

I HAVE the honour to submit the following report on the health and sanitary condition of Ceylon and on the administration of the institutions of the Ceylon Civil Medical Department for the year ended December 31, 1923.

SECTION I.—ADMINISTRATIVE.

2. *Staff.*—A Principal Civil Medical Officer ; an Assistant Principal Civil Medical Officer ; a Sanitary Commissioner ; a Director of the Bacteriological Institute ; a Malariologist ; 9 Provincial Surgeons ; 4 Medical Superintendents ; 60 Medical Officers, Grade I. ; 146 Medical Officers, Grade II. ; a Medical Officer in Charge of the Anti-Tuberculosis Institute, Colombo ; 2 Anæsthetists ; an Assistant Sanitary Commissioner ; 7 Medical Officers of Health ; a Sanitary Engineer ; a Sanitary Superintendent ; 3 Supervising Sanitary Inspectors ; 129 Sanitary Inspectors ; 3 Inspecting Medical Officers of Estates ; 3 Assistant Medical Officers of Estates ; a Female Medical Practitioner ; 349 Apothecaries ; 34 European Matrons and Trained Nurses ; 84 European Religious Mothers and Sisters ; 279 Ceylonese Matrons, Nurses, and Pupil Nurses ; a Hospital Assistant in the Borella Convict Hospital ; 39 Hospital Stewards ; 9 Inspectors of Vaccination ; 134 Male Vaccinators ; 9 Female Vaccinators ; Principal Civil Medical Officer's Office Financial Branch : an Accountant, Book-keeper, Cashier, and 29 Clerks, and in the General Branch : a Chief Clerk in the Special Class of the Clerical Service and 23 Clerks ; Civil Medical Stores : a Superintendent, an Assistant Superintendent, an Opium Storekeeper, and 14 Clerks ; 40 Opium Clerks and Sellers ; and about 2,100 minor employees in Offices, Stores, Institutes, Hospitals, Dispensaries, and Sanitary Branch.

3. *Promotions and Appointments.*—Drs. L. A. Prins and A. L. Pereira, Medical Officers of Grade I., were appointed Inspecting Medical Officers of Estates, and Drs. C. S. Ratnam and F. R. Alles of the same grade were promoted Provincial Surgeons. Drs. K. Rajah, D. S. V. Walpola, J. B. Rodrigo, H. C. van Dort, S. Ponniah, and D. B. de Alwis were promoted from Grade II. to Grade I. Dr. S. C. de S. Wijeratna was appointed Physician, Out-patients Department, and Dr. W. L. de Silva, Additional Physician, General Hospital, Colombo ; 16 Medical Officers were appointed to Grade II. to fill vacancies and new appointments sanctioned by Government.

4. *Officers on Leave.*—Thirteen Medical Officers were on long leave in Europe at the beginning of the year, 16 proceeded to Europe, and 11 returned to the Island during the year.

5. *Financial.*—Revenue and expenditure in 1922–1923—

EXPENDITURE.

	Rs.	c.		Rs.	c.
Salaries, wages, &c. . .	2,150,976	79	Incidental expenses . .	11,379	23
Diets . .	1,444,513	18	Purchase of opium, &c. . .	218,757	57
Equipment and contingencies . .	332,650	86	Compensation for loss in opium revenue	83,902	12
Medicine, &c. . .	561,148	13	Anchylostomiasis campaign . .	70,141	62
Bacteriological Institute, &c. . .	26,938	86	Compensation for the loss of personal effects by fire . .	840	0
Tuberculosis Institute and sanatorium and hospital . .	85,230	51			
Transport and travelling . .	328,368	56			
Rents . .	46,807	43			
Grants . .	11,000	0			
Sanitation and epidemics . .	90,701	82			
Special equipments . .	19,567	78			

Head 22b.—Institute of Medical Research.

Salaries, wages, &c. . .	30,256	23
Travelling, &c. . .	7,314	13
Incidental expenses . .	3,958	88

REVENUE.

	Rs.	c.		Rs.	c.
Hospital and dispensary receipts . .	201,530	54	Medical aid dues, maintenance, and visits . .	165,079	54
Sale of drugs, &c. . .	12,366	41	Sale of opium . .	548,912	53
Sale of drugs under Medical Wants Ordinance . .	9,509	36	Medical aid dues export duties . .	984,602	3

SECTION II.—POPULATION : PUBLIC HEALTH.

6. The estimated population of Ceylon on December 31, 1923, inclusive of immigrant coolies, was 4,703,344. 9,370 of these were Europeans. An increase of 82,212 and 270 respectively over the previous year's estimate.

7. *Vital Statistics.*—181,441 births were registered, equivalent to an annual rate of 38·57 per 1,000 of the population, as compared with 179,858 births and an annual rate of 38·5 in 1922. 141,894 deaths were registered during the year, 120,837 the previous year, an increase of 21,057 deaths during the year under review. The death-rate for 1923 was 30·16 and for 1922 27·4 per 1,000.

8. *Causation of Deaths.*—The following table shows the number of deaths registered under the several classes of disease :—

I.—General diseases—		VI.—Non-venereal diseases of genito-urinary system and annexa . .	1,387
(a) Epidemic diseases . .	9,475	VII.—The puerperal state . .	3,913
(b) Septic diseases . .	169	VIII.—Diseases of the skin and cellular tissues . .	11,777
(c) Tuberculosis diseases . .	3,755	IX.—Diseases of bones and organs of locomotion . .	16
(d) Venereal diseases . .	285	X.—Malformations . .	21
(e) Cancer or malignant diseases . .	433	XI.—Diseases of early infancy . .	8,724
(f) Other general diseases . .	10,684	XII.—Old age . .	4,822
II.—Diseases of the nervous system and organs of special sense . .	18,725	XIII.—Affections produced by external causes . .	2,435
III.—Diseases of the circulatory system . .	1,131	XIV.—Ill-defined diseases . .	28,789
IV.—Diseases of the respiratory system . .	14,573		
V.—Diseases of the digestive system . .	20,780		

9. The more notable causes of death were the following diseases :—

1. Infantile convulsions . .	16,166	10. Malaria . .	2,118
2. Diarrhoea . .	10,888	11. Anchylostomiasis and its sequelæ . .	1,857
3. Pneumonia . .	8,921	12. Puerperal septicæmia . .	1,568
4. Rickets . .	5,097	13. Enteric fever . .	597
5. Intestinal parasites . .	4,257	14. Tetanus . .	241
6. Anæmia . .	3,416	15. Rabies . .	30
7. Dysentery . .	3,326	16. Deaths attributed to pyrexia of unknown origin . .	23,328
8. Phthisis . .	3,322		
9. Dropsy . .	2,862		

A large number of the deaths registered under pyrexia of unknown origin were undoubtedly due to malaria or diseases concurrent with it, as this disease was very prevalent in the greater part of the Island.

10. *Infantile Mortality.*—16,166 deaths from infantile convulsions were registered during the year, and this number represents 11·39 per cent. of the total number of deaths registered. In the 33 principal towns of the Island the infant mortality rate was 258 per 1,000, as against 240 the previous year and 238 in 1921, a gradual increase which indicates the need for childwelfare centres and crèches, ante-natal clinics, and trained midwives. Some endeavour to aid mothers in the care of their infants is being made in the larger towns by Social Service Circles. In the ante-natal clinic attached to the De Soysa Lying-in Home, Colombo, advice was given to 319 expectant mothers, who paid 326 visits during the year, the corresponding figures for the previous year being 216 and 226 respectively.

Fifty-one midwives were trained at the Lying-in Home, Colombo, in 1923, 52 in 1922.

11. *Vital Statistics on Estates.*—26,921 births and 17,551 deaths were reported from estates during the year, as against 24,527 births and 14,724 deaths in 1922. The birth-rate per 1,000 per annum calculated on the estimated estate population on December 31, 1923, was 57 and the death-rate 28 for the year, as against 50 and 32 respectively in the previous year.

The following table shows the principal causes of death on estates :—

	1922.	1923.		1922.	1923.
1. Debility ..	2,946	3,558	6. Dysentery ..	852	1,248
2. Pneumonia ..	2,315	2,932	7. Phthisis ..	253	278
3. Infantile convulsions ..	1,207	1,554	8. Dropsy ..	125	106
4. Anchylostomiasis ..	1,095	1,099	9. Other diseases ..	5,071	5,804
5. Diarrhœa ..	860	972			

12. *Malaria* was very prevalent and showed a marked increase as regards hospital admissions, and cases treated at dispensaries and hospital out-patient departments over the large numbers of the previous year.
34,522 hospital admissions and 1,193,225 dispensary cases were recorded during the year, as against 29,377 and 956,810 respectively, in 1922.

2,118 deaths from malaria were registered in 1923 and 1,621 in 1922 ; but 23,328 deaths in 1923 and 20,171 deaths in 1922 were registered under pyrexia of unknown origin. Many of these were probably due to malaria.

The following table shows the hospital admissions in the different Provinces and total dispensary cases for the last three years --

Hospital Admissions : Malaria.

	1921.		1922.		1923.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
General Hospital, Colombo	1,125	20	2,121	37	2,280	15
Western Province ..	4,036	71	6,640	74	6,062	87
Central Province ..	5,077	97	3,893	54	5,887	107
Northern Province ..	2,369	31	1,978	15	2,158	19
Eastern Province ..	56	5	755	4	867	11
Southern Province ..	1,504	30	1,476	26	1,911	35
North-Western Province ..	5,014	74	3,015	98	3,201	76
North-Central Province ..	2,432	46	2,072	42	2,603	68
Province of Uva ..	2,579	31	2,856	50	3,111	66
Province of Sabaragamawa	2,461	52	3,456	63	5,087	76
Railway Extensions ..	—	—	1,115	6	1,355	8
Total ..	27,453	457	29,377	475	34,522	568
Dispensary cases ..	888,699		956,810		1,193,225	

Quinine to the value of Rs. 276,120·96 was issued free for preventive and curative purposes. It was distributed by itinerating apothecaries and vaccinators on fever duty and by headmen through the Government Agents during the fever seasons.

Report of the Malariologist, Mr. Carter, for the year :—

Staff.—The Malariologist, 2 Medical Officers (Drs. K. J. Rustomjee and E. T. Saravanamuttu), 8 Entomological Assistants, 1 Laboratory Assistant, 1 Laboratory Attendant, and 5 coolies. The office staff consisted of 1 clerk of the Subordinate Clerical Service, Grade II.

In October, 1923, an Acting Medical Officer (Dr. W. H. Schokman) was temporarily attached to this office for work in connection with the anti-malaria campaign at Trincomalee.

Distribution of Staff.—The Malariologist, 2 Medical Officers, the laboratory assistant and attendant were attached to the Colombo office. In September, 1923, Dr. K. J. Rustomjee was transferred to Trincomalee to inaugurate and direct the campaign at that town. The Entomological Assistants were stationed at the following centres, where temporary laboratories were maintained : Anuradhapura (2), Kurunegala (2), Jaffna (2), and Badulla (2) ; two assistants were transferred to Trincomalee from Jaffna and Badulla in September and one to Colombo from Kurunegala in October.

Extension of Service.—In November, 1923, the Finance Committee of the Legislative Council approved the extension, by one year, of the period of service of this officer in order that certain lines of research could be completed, and a detailed report on the subject of malaria control in Ceylon and the work accomplished since June, 1921, issued. This report will be submitted to Government at the end of 1924.

The Committee further recommended that an Additional Medical Officer be attached to the staff for training in the various subjects associated with the disease and its control, a specialized knowledge of which is essential for the successful direction of campaign work. An officer, Dr. W. L. P. Dassanayake, has since been appointed.

Education and Propaganda.—Public lantern lectures in English and the vernaculars have been given at Anuradhapura, Badulla, Trincomalee, and Gampaha, and lantern lectures and demonstrations at schools at Badulla and Trincomalee. An extensive series (about 80) of lantern slides of local application, and several posters, illustrating the more important facts and principles underlying modern methods of prevention and control, have been prepared during the past two years. These slides and posters should prove of considerable educational value, and should be of great service in the future when malaria propaganda work is definitely organized. Several thousand pamphlets and handbills on malaria have been distributed to towns and villages in various parts of the Island. A malaria exhibit was sent to the Agri-Horticultural Show at Gampaha in July, 1923. This exhibit included a complete series of the anopheles mosquitoes found in Ceylon with enlarged paintings of the commoner and more dangerous malaria carrying species, living malaria and non-malaria carrying mosquitoes and their larvæ, larvivorous fish (imported and indigenous), and various other specimens of general interest ; also photographs and paintings of anopheles breeding places and malaria parasites, maps, posters, diagrams, &c.

A course of lectures and demonstrations on malaria and its control was given during April and May to the Training Class for Sanitary Inspectors held by the Sanitary Branch of the Medical Department.

A useful and instructive pamphlet on malaria was prepared by Dr. L. Nicholls for the use of teachers, and was published by the Department of Education in November ; it is been widely distributed to schools and also to the general public.

Malaria Research and Control Works.—Research work in connection with malaria was continued on the lines indicated in the report for the year 1922. Detailed malaria surveys of the four centres mentioned above and of Trincomalee were completed, and further inquiries instituted into the bionomics and seasonal prevalence of anopheles and other factors influencing the incidence and spread of the disease at these towns. Other

investigations included continuance of the work on paddy cultivation and malaria as detailed in the previous report, and an attempt to determine the reasons for the relatively low incidence of malaria in the south-west portion of the Island. The results obtained from observations on the breeding of anopheles mosquitoes in paddy fields made throughout a completed year (August, 1922, to August, 1923), appear to be of sufficient interest and importance to justify an extension of the work. It has, however, been found impracticable to continue examinations every month at all the towns (13) originally selected, and accordingly the work has been restricted to the five centres at which assistants are stationed.

Additional and more precise information relative to the various investigations has been obtained, but since in many aspects the separate lines of work are interconnected, and complete results are not in all cases available, it is considered advisable to defer further discussion to the final report referred to above. Much of the laboratory work connected with these investigations is performed in Colombo; it involves a large amount of routine examination work, particularly during the period of the north-east monsoon, and throws a heavy strain upon the staff. The inquiries in progress relative to the bionomics, distribution, and prevalence of anopheles mosquitoes are largely quantitative in nature, and are for the most part based upon the larval stage of these insects. During the past year such routine work alone has involved the microscopical examination of an average of 4,400 anopheles larvæ per month and a total of 1,448 blood films.

2. Further collections of larvivorous fish have been made and are awaiting identification. *Haplochilus lineatus*, the species occurring so abundantly in the swampy areas of the Western and Southern Provinces, has now been found in large numbers in swamps and flooded paddy fields on the east coast in the Batticaloa, Trincomalee, and Mullaittivu Districts. With the exception of the last named places the species has been rarely found in the dry zone of Ceylon. Attempts to establish it in nurseries, for subsequent distribution to wells and non-permanent pools in districts where malaria is intense and larvivorous fish relatively scanty, have not proved very successful. Much more promising results have been obtained with the West Indian species *Gambusia affinis*—"Millions"—which is not only more voracious and prolific, but less susceptible to changes of environment. With care and attention "Millions" should eventually become established throughout the greater part of the Island, when their periodical distribution to wells and non-permanent pools should afford a valuable measure of control. Additional nurseries for both species were opened at Jaffna in September; *Gambusia* increased sufficiently in numbers to allow of their initial distribution in November to wells in which *Anopheles* were breeding. Distribution of "Millions" to wells and pools was also carried out at Talaimannar and Trincomalee during the last few months of the year.

3. Malaria control measures have been in operation during the past year at Anuradhapura, Trincomalee, Mahara Jail, Kurunegala, and Badulla. The campaigns at Anuradhapura and Trincomalee are intended to serve as demonstrations and it is hoped will indicate the nature and value of anti-malaria works in the low-country; they are under the control and direction of this office, but are conducted in close co-operation with the local authorities, who also assist financially. At Mahara Jail, where a serious epidemic occurred in 1921, the works recommended have been carried out under supervision of Jail Superintendent and the Resident Medical Officer; the results for the past year have been satisfactory, and a continued steady drop in the curve for hospital admissions for malaria has taken place since May. At Kurunegala and Badulla, anti-mosquito measures of a minor nature have been performed by the local authorities, but it is doubtful whether such measures alone can produce any marked effect upon the incidence of malaria. At both of these towns the work is greatly handicapped by lack of funds, and—of equal importance—a trained staff to direct and control initial measures.

Anti-Malaria Campaign, Anuradhapura.—This campaign was commenced in May, 1923, with a labour force of 30 convicts under the control of guards and the immediate supervision of Entomological Assistant, Mr. G. D. A. Perera. This force was supplemented by 12 convicts allocated for work under the local authorities, and during the period May to December maintained an average daily strength 38·2.

The area comprised within the town limits is extensive (approximately 9½ square miles), and consists largely of wooded park lands and paddy fields with patches of dense jungle; the town proper is practically confined to the central area and covers approximately 1½ square mile. Most of the park lands are archaeological reserves, which owing to extensive excavatory work during the past twenty years or so, present numerous irregularities of the surface; they contain many depressions, pits, and blind trenches capable of retaining water and acting as breeding places of anopheles during the wet season.

To facilitate the systematic execution of initial anti-mosquito measures, the town was divided into ten sections; of which, numbers 1, 2, 3, and 5 included the more densely populated central portion. Work was commenced in the latter area, and during the rest of the dry season (*i.e.*, until October) was largely restricted to clearing and burning jungles and low growing vegetation and clearing and training drains and the margins of the more extensive pools and pokunas. With the advent of the rains and consequent softening of the ground, drainage, filling, and levelling operations were vigorously pushed forward. Oiling as a temporary measure of control of pools and swamps which could not be eliminated or permanently improved at the time was commenced in December, and carried out over an area with radius 1¼ mile from the centre of the town.

It was originally intended to start oiling in October, but unfortunately owing to difficulties connected with the grazing of stock the matter was delayed.

By the end of the year minor works capable of being undertaken by the brigades in sections 1, 2, 3, and 5 were largely completed; a summary of the work performed is, as nearly as can be estimated, as follows:—

Extent of jungle and low shrub cleared ..	146 acres
Number of pools (including pokunas) cleared and trained ..	306
Contents of pits, swamps, &c., filled (171 in number) ..	212,787 cubic feet
Contents of earth drains and irrigation channels, cleaned, trained, and regraded ..	507,778 cubic feet
Contents of new drains cut ..	7,550 cubic feet
Number of situations oiled weekly during December ..	400

Anti-mosquito works in the remaining and more rural sections of the town must at first be restricted to the neighbourhood of dwellings, but before these are undertaken two important problems involving further work in the central area require attention.

These are (1) the reconstruction of the Halpan-ela and improvement of the drainage system, and (2) the abolition of non-essential wells and the cleaning, repair, and introduction of the larvivorous fish, *Gambusia*, into others.

The Halpan-ela flows through the town in a northerly direction, and normally should drain a relatively large area; its present condition, however, is such that drainage is entirely prevented, and a serious menace to the health of the town is produced. It is, in fact, no longer a stream but an extensive series of more or less isolated swamps and pools, bordered in many places by low marshy areas, which owing to the continual discharge of waste water used in irrigation, persist even during the dry season. Mosquito surveys of this ela have shown that it is a prolific breeding place, and that larvæ of efficient carrier species are abundant in certain situations. Closely connected with the reconstruction of this channel is the reorganization and improvement of the general system of drainage of the town. Improvements in the central area are to be undertaken in the near future by the local authorities, but these alone will not greatly affect the problem of malaria reduction.

The entire drainage system requires early attention, and it is only by rendering it efficient that numerous breeding places of anopheles—at present controlled by temporary measures—can be eliminated. A census of wells has been made, and it is hoped that the problem of their control will be solved during the coming year. The fact that many of the essential wells contain large carnivorous fish (*e.g.*, *Lula Ophiocephalus striatus*) necessitates their thorough cleansing and emptying before *Gambusia* can be introduced. Supplies of the latter are present at the town nursery. Propaganda work was undertaken during the early months of the campaign, and included lantern lectures in English and the vernaculars and the distribution to householders of pamphlets on the cause and prevention of malaria and of handbills containing simple instructions relating to the care of compounds, &c. In July, a further and more detailed examination of random samples of the population was made with a view to obtaining evidence which would serve as a basis of future measurement of the results of the campaign. For such purpose the hospital statistics are unfortunately of doubtful value, since they include very large numbers of cases from the surrounding highly malarious districts whose place of residence cannot always be satisfactorily determined. In making these examinations, the town was regarded as consisting of six sections radiating from the centre, but the inhabitants of the bazaar and the station staff were treated separately; the results obtained were as follows :—

Section.	Spleen Rate.				Parasite Rate.			
	Children (2-12 Years).		Adults.		Children.		Adults.	
1	42·6	..	41·7	..	37·5	..	18·0
2	62·0	..	30·2	..	85·0	..	4·0
3	31·7	..	19·0	..	26·0	..	25·0
4	70·2	..	32·8	..	80·5	..	5·5
5	61·5	..	45·5	..	66·6	..	46·6
6	63·3	..	60·0	..	9·1*	..	—
Bazaar..	..	38·4	..	21·1	..	11·1	..	10·5
Railway	..	49·2	..	35·7	..	12·1	..	11·5
<hr/>								
Town	..	49·6		31·2		41·3		16·6
<hr/>								
Total examined	..	677		1,076		300		410

Malaria parasites were observed in a total of 192 films (27 per cent.), the distribution of the various species being *Plasmodium malarix* (Quartan malaria) 41·7 per cent., *P. vivax* (Simple tertian malaria) 39·6 per cent., *P. falciparum* (Malignant or subtertian malaria) 9·9 per cent., double infections of *P. malarix* and *P. vivax* occurred in 7·8 per cent., and of *P. malarix* and *P. falciparum* in 0·5 per cent.; one triple infection (0·5 per cent.) was observed. In view of these results and of the probability that a considerable proportion of the cases of malaria occurring during the early part of the wet season are due to relapses, an attempt was made to obtain the systematic distribution of quinine throughout the town. It was hoped that, during at least the first two months of the wet season, a sufficiently high percentage of the population (census 1921—7,781) could be prevailed upon to take the drug regularly to ensure a definite reduction in the parasite rate and number of relapses thereby lowering the infectivity rate of anopheles and subsequently reducing the number of primary or re-infections. Arrangements were therefore made for the bi-weekly distribution of quinine bisulphate (adults grs. xx. per week, children grs. vi.-xii.) in tabloid form to householders, by house-to-house visits of two apothecaries, and to school children. Quinine cards were issued to householders, and instructions were given to the apothecaries to administer the drug themselves or refuse delivery. Detailed results of this work are not yet available, but the weekly returns tend to support the impression gained that while the average townsman is perfectly willing and even anxious to take the drug when actually ill, he not infrequently declines to accept it—or does so only at irregular intervals—on his apparent recovery.

Anti-Malaria Campaign, Trincomalee.—Work at this town was begun on September 13, 1923, under the direction and control of Dr. K. J. Rustomjee. On the recommendation of the Sanitary Commissioner the scope of the campaign was extended to include general sanitary measures, for which purpose Dr. Rustomjee was deputed to act as Sanitary Officer; a report on this work in the town and neighbouring villages is given elsewhere. A temporary laboratory was opened in Fort Frederick during the month, when two Entomological Assistants (Messrs. J. L. N. Fernando and S. R. de Silva) were attached to the campaign. Subsequently, in October, Dr. W. H. Schokman was appointed to assist Dr. Rustomjee with a view to taking charge of the work on the latter's return to Colombo. During the first few weeks (until the end of October) work was restricted to malaria and mosquito surveys, propaganda, and organization.

The survey work was performed in relation to the various sections (12) into which the town is divided by the local authorities for sanitary purposes, and included a spleen census, blood examination, and examinations of all potential breeding places of anopheles mosquitoes.

The results of the spleen census, made by house-to-house visits, are given in the following table :—

Section of Town.	Children (2-12).						Adults.					
	Number Examined.		Number Positive.		Spleen Rate.		Number Examined.		Number Positive.		Spleen Rate.	
1 ..	105	..	7	..	6·6	..	86	..	2	..	2·3	
2 ..	200	..	52	..	26·0	..	152	..	11	..	7·2	
3 ..	112	..	22	..	19·6	..	89	..	7	..	7·8	
4 ..	80	..	11	..	13·5	..	75	..	2	..	2·6	
5 ..	140	..	21	..	15·0	..	87	..	10	..	11·4	
6 ..	139	..	10	..	7·1	..	113	..	8	..	7·0	
7 ..	87	..	6	..	6·8	..	125	..	3	..	2·4	
8 ..	96	..	9	..	9·3	..	87	..	4	..	4·5	
9 ..	96	..	10	..	10·4	..	87	..	4	..	4·5	
10 ..	119	..	12	..	10·0	..	75	..	2	..	2·6	
11 ..	94	..	15	..	15·9	..	73	..	3	..	4·1	
12 ..	63	..	13	..	15·8	..	75	..	11	..	14·6	
<hr/>												
Town	1,331		188		14·1		1,124		67		5·9	

* Section 6 is sparsely populated and 11 blood films only were examined.

In addition, 648 school children were examined and spleen rates ranging from 5·3 to 38·2 with an average of 13·7 were obtained. An analysis of the school children in which the spleens were enlarged, in relation to their place of residence in the town showed that 19·1 per cent. lived in section 2, 15·7 per cent. in section 3, 14·6 per cent., in section 1, and 11·2 per cent. in section 12; in the remaining sections the percentages ranged from 0 to 7·8. No greatly enlarged spleens or cases of malaria cachexia were observed. Prior to the malaria and influenza epidemic in the early months of the year, the spleen rate of children in Trincomalee town was considerably lower; and of 289 children examined in November, 1921, only 14 (spleen rate 4·8) showed splenic enlargement. Immediately after the epidemic, in June, 1923, a rate of 37·6 (178 children examined) was found, but a large proportion of the enlargements observed was slight and would tend to become non-palpable in the course of a few months. A census of malaria cases taken by the local authorities during the epidemic showed that case rates of 23·8, 23·0, and 17·3 occurred respectively in sections 3, 2, and 11; of 10·3 to 11·8 in sections 1, 5, 8, 9, 10, and 12; and of 5·2 to 8·8 in sections 4, 6, and 7.

It would thus appear that the most malarious portions of the town are the southern (sections 3 and 2) and northern (sections 11 and 12) extremities; and that the least malarious areas are those situated in proximity to the east shore (sections 6, 7, and 8 and the southern part of 10). In this connection it may be observed that the southern and northern portions of the town are largely rural or semi-rural in character; the former includes many coconut and palmyra plantations and large gardens and is moderately populated, the latter contains extensive tracts of jungle with areas of salt marsh and abandoned paddy fields and is sparsely populated. The sections situated near the east shore include the bazaar and form the most densely populated part of the town. Blood examinations of random samples of children (224 examined) gave a parasite rate of 9·3. Simple tertian malaria and quartan malaria appeared to be equally prevalent at the time of examination, the specific organism of each form of the disease being present in 42 per cent. Of the positive smears, parasites of subtertian malaria occurred in 16 per cent.

The mosquito survey consisted of the quantitative examination of all potential breeding places of anopheles situated in sections 1–11. Examinations in section 12 were deferred owing to its extensiveness, wild nature (being entirely jungle), and scanty population. The material collected was preserved and subsequently identified by means of the microscope. The sample obtained consisted of 1,554 larvæ referable to seven* species of anopheles; these arranged in order of larval prevalence are—

	Per Cent.
1. <i>Anopheles minimus</i> , Theob. (? <i>listoni</i> , List)	69·87
2. <i>Anopheles subpictus</i> , Grassi (<i>rossi</i> , Giles)	25·34
3. <i>Anopheles hyrcanus</i> , Pall (<i>sinensis</i> , Wd)	1·74
4. <i>Anopheles jamesi</i> , Theob.	1·33
5. <i>Anopheles culicifacies</i> , Giles	0·91
6. <i>Anopheles barbirostris</i> , Wulp.	0·49
7. <i>Anopheles fuliginosus</i> , Giles	0·28

The following table shows the various types of situations examined and the relative prevalence of the different species of anopheles; the rates given denote the numbers of larvæ obtained in every 100 ladles, or in the case of wells, 100 nets (Bentley's type) examined —

Situation.	Number of Ladles examined.	Larval Rate.	Analysis of Species.										First Stage Larvæ unidenti- fied.
			A.	A.	A.	A.	A.	A.	A.	A.	A.		
			minimus.	subpictus.	hyrcanus.	jamesi.	culici- facies.	barbiros- tris.	fuligi- nosus.				
Swamps	150	7·3	—	3·3	3·3	—	—	—	—	—	—	0·7	
Tanks	650	6·7	0·15	3·21	0·15	1·84	—	—	—	—	—	1·38	
Pools and pits	5,600	6·8	—	5·29	0·25	0·11	0·03	0·01	0·07	—	—	0·96	
Earth drains	1,100	3·3	0·45	1·91	—	0·09	—	0·45	—	—	—	0·36	
Cement tanks	550	1·8	0·54	1·26	—	—	—	—	—	—	—	—	
Paddy fields	50	8·0	—	—	—	—	—	—	—	—	—	8·0	
Barrels, wooden	350	12·6	12·6	—	—	—	—	—	—	—	—	—	
Total	8,450	6·24	0·62	4·11	0·24	0·22	0·02	0·07	0·05	—	—	0·91	
Wells	4,560 (nets)	21·4	19·9	0·3	0·1	—	0·2	0·02	—	—	—	0·9	

In all, 880 potential breeding places were examined; and of these, 754 were wells. *Anopheles* larvæ were not abundant as may be perceived by the relatively low rates obtained, but it must be remembered that this survey was made at the end of the dry season when the extent of surface water was greatly reduced. Similar work performed in February, 1923, in section 11, indicates that the results obtained from a survey made during the wet months will reveal important differences. The collections made in February, 1923, showed *A. culicifacies* and *A. minimus* as the most prevalent species, the former being found in 44 per cent. and the latter in 39 per cent. of the situations examined. Both species were breeding extensively in wells, and *A. culicifacies* was also common in disused paddy fields, pools, and borrow pits. In the present survey, larvæ of *A. culicifacies* were present in only 1·06 per cent., and of *A. minimus* in 24·2 per cent. of the places examined. *Anopheles* larvæ were found in 33 per cent. of the wells examined (754), and *A. minimus* larvæ in 28·9 per cent.; abandoned wells or wells which had not been used for a period of two months or more were more heavily infected, 50 per cent. containing larvæ. The larval rate in positive wells was 68·3 per 100 nets. Malaria control measures were commenced on October 28, with a labour force of 40 coolies under 3 overseers; subsequently, in December, it was found necessary to increase the force to 60—a number of women being employed for lighter work. As at Anuradhapura, initial measures were restricted to clearing and burning jungle, cleaning and training drains, &c., until the rains began (end of November) when draining and filling operations were introduced. These works were commenced in section 3, but at the close of the year had been extended to sections 2 and 4. Most of the work required within the town area is on private lands, and it became necessary therefore to obtain the close co-operation of the local authorities and landowners to enable control measures to be carried out satisfactorily. In the great majority of cases arrangements were made whereby the necessary works were performed by the brigades, and the landowner contributed a proportion of the cost. The larger works completed by December included (1) the clearing of approximately 5 acres of dense scrub jungle (containing much cactus from the neighbourhood of the Residency; (2) the drainage, levelling, and clearing of the low-lying area south of the Residency (involving the construction of a main drain

* Subsequently, in February, 1924, two additional species—*A. kawari*, Js, and *A. aitkeni* var *insulæflorum*, Swell—were found; they are apparently rare and of little economic importance.

325 feet in length, the commencement of which had to be cut through an extremely hard quartz-like material) : and (3) the drainage of a marsh approximately 2 acres in extent. All works in section 3 were completed during December ; these involved the construction of 30 drains of a total length of 4,608 feet at an average cost of 2·7 cents per foot, the cleaning, training, and regrading of 1,892 linear feet of existing drains, and the filling of numerous pits and pools of various sizes (total contents 26,700 cubic feet) with gravel. In December, an oiling gang consisting of 6 coolies and a kangany was formed to treat all collections of surface water in which anopheles were known to breed, and which could not be immediately improved or were situated outside the sections in which permanent measures were being undertaken. Applications of oil (kerosine 1 part, fuel oil 4 parts) were made regularly once a week (or in sheltered situations once in 10 days) to each breeding place ; during December the situations so treated numbered over 400.

As shown above, wells were found to be an important source of anopheles—particularly *A. minimus*—and it was early decided to attempt their control by means of the larvivorous fish, *Gambusia*. Supplies were introduced into a large cement tank in the town, and fed from time to time on minute pieces of dried fish. They increased sufficiently rapidly in numbers to allow of an initial distribution within a few weeks of their arrival. By the end of December nearly 2,000 of these fish had been distributed to 325 wells.

Anti-malaria works of the nature indicated above will be continued throughout 1924 in the remaining sections of the town, and when completed should—providing they are efficiently maintained—produce beneficial effects. It is not improbable, however, that certain major works, which cannot be undertaken by the brigades, will be necessary in connection with these portions of the town which are liable to flooding during the wet season. There are four chief flood areas within the town ; two of these are very extensive and it is feared will present serious difficulties should investigations now in progress show that their control is essential.

13. *Cholera*.—There has been no outbreak of cholera in the Island for three years. The last case occurred in 1920.

14. *Smallpox*.—There was an outbreak of smallpox in Kandy at the end of the previous year, and the disease was carried to several centres of infection during the first quarter of the year by absconding contacts. 200 cases with 31 deaths were reported from the Central Province, 26 cases with 2 deaths from the Western Province, 5 cases with 1 death from the Province of Sabaragamuwa, and 1 case from the North-Western Province.

Five cases were landed in Colombo from steamers, and 3 cases occurred in Colombo town with 1 death.

There were 240 cases with 35 deaths, as against 337 cases with 43 deaths in 1922.

15. *Vaccination*.—The total number of primary vaccinations performed during the year was 138,092 ; of these, 124,462 were successful and 1,859 were failures.

In 11,771 cases the results were not determined.

The percentage of successful primary vaccinations was 98·52 per cent. in 1923, 93·7 per cent. in 1922.

Vaccination is carried on by trained male and female vaccinators—the former visit villages and estates periodically according to annual programmes of vaccination and the latter itinerate in villages occupied by Muhammadans to vaccinate the female members of their families and children.

16. *Government Vaccine Establishment*.—The officer in charge reports 480 calves were received on hire from the contractor ; 474 calves were used for vaccination during the year ; and of these, 466 were returned.

Seed lymph for the vaccination of calves was obtained from the Lister Institute of Preventive Medicine, London, and from the King Institute, Madras ; and was also prepared locally. 160,593 tubes of calf lymph were issued from this establishment during 1923. Of these, 1,859 tubes were sold and realized a sum of Rs. 1,565·50, and 206 tubes were issued to the Colombo Municipality, and the balance to the vaccinators of the Department. A large quantity of lymph is also stored in bulk as a reserve supply.

98·81 per cent. of primary vaccinations with lymph issued during the year were successful.

17. *Enteric Fever*.—The total number of cases treated in Government hospitals during the year was 921 with a death-rate of 29·31 per cent., as against 857 cases with a death-rate of 21·93 per cent. the previous year.

Patients are usually taken to the hospitals for admission in late stages of the disease and the mortality rate is therefore high.

These figures do not indicate the extent to which enteric fever prevails in towns and rural districts generally. Probably many cases occur which are neither recognized nor reported. The Registrar-General's returns show that 597 deaths from enteric fever and 23,328 deaths from " general fever " (pyrexia of unknown origin) were registered during the year, and undoubtedly some of the latter should have been included in the former.

The following table gives some evidence of the incidence of the disease in Colombo and the Provinces as judged from hospital admissions :—

	1921.				1922.				1923.			
	Cases.		Deaths.		Cases.		Deaths.		Cases.		Deaths.	
General Hospital, Colombo .	309	..	102	..	292	..	95	..	255	..	104	
Western Province ..	214	..	56	..	188	..	33	..	335	..	87	
Central Province ..	174	..	40	..	142	..	29	..	118	..	26	
Northern Province ..	57	..	11	..	26	..	4	..	20	..	2	
Eastern Province ..	3	..	—	..	7	..	2	..	4	..	1	
Southern Province ..	94	..	18	..	78	..	11	..	91	..	16	
North-Western Province ..	7	..	2	..	16	..	7	..	27	..	9	
North-Central Province ..	13	..	4	..	8	..	2	..	9	..	1	
Province of Uva ..	9	..	3	..	10	..	2	..	6	..	1	
Province of Sabaragamuwa	23	..	6	..	33	..	3	..	55	..	23	
Railway Extensions ..	—	..	—	..	—	..	—	..	1	..	—	
Total ..	903		242		800		188		921		270	

18. *Diphtheria*.—This disease rarely occurs in the Island. Only 15 cases with 6 deaths were recorded during the year; and of these, 8 cases were treated in the Infectious Diseases Hospital, Colombo.

19. *Influenza*.—A mild form of influenza prevailed in all the Provinces at different periods of the year. 4,443 cases were treated in Government hospitals with 162 deaths, a mortality rate of only 3·64 per cent.

23,372 cases were treated at dispensaries during the year. Of these numbers, 3,318 out-patients and 1,515 hospital admissions were treated in the Western Province and 13,893 and 1,210 respectively in the Central Province.

20. *Dysentery*.—There were outbreaks of dysentery in the Western and Southern Provinces, and this disease was unusually prevalent during the year, due probably to the abnormal rains. The number of cases treated in Government hospitals was 5,884 with 993 deaths, as against 3,446 and 673 respectively in 1922. 25,516 cases were treated at dispensaries during the year. The most common source of infection is the drinking water, which is only obtainable, in many villages, from shallow unprotected wells liable to pollution; but it is possible that contaminated food, and especially green vegetables, plays an important part in the dissemination of this disease. 3,326 deaths from dysentery were registered by the Registrar-General's Department during 1923, as against 2,515 fatal cases registered in 1922.

21. *Cancer and Sarcoma*.—The number of patients admitted to the various hospitals during the year with malignant growths was 443 with 59 deaths, as compared with 463 cases with 79 deaths in 1922, 395 cases with 64 deaths in 1921, and 617 cases with 76 deaths in 1920.

The total number of deaths from cancer reported by the Registrar-General was 433, as against 461 registered in 1922. Thirty-one cases of cancer were admitted to the Lady Havelock Hospital for Women during the year under review, of the cervix uteri 17, uterus 4, ovary 1, breast 2, vulva 2, vagina 1, liver 1, bowel 1, rectum 1, and anus 1. The average age was 41·16.

The following is an analysis of admissions for Cancer to the General Hospital, Colombo, in 1923:—

Site.		Number of Cases.		Average Age.		Male.		Female.		Operated.		Inoperable.		Refused Operation.
Cheek	..	50	..	55	..	37	..	13	..	10	..	33	..	7
Of jaw	..	23	..	50	..	17	..	6	..	4	..	13	..	6
Lower jaw	..	19	..	49·7	..	19	..	—	..	7	..	9	..	3
Upper jaw	..	13	..	55·5	..	11	..	2	..	5	..	5	..	3
Antrum of highmore	..	2	..	45	..	—	..	2	..	2	..	—	..	—
Lip ..	..	5	..	47·25	..	4	..	1	..	4	..	1	..	—
Tongue	..	18	..	51·3	..	15	..	3	..	7	..	6	..	5
Rodent ulcer	..	1	..	56	..	1	..	—	X ray Treatment		..	—	..	—
External ear	..	1	..	65	..	1	..	—	..	1	..	—	..	—
Œsophagus	..	10	..	43·15	..	7	..	3	..	2	..	4	..	4
Stomach	..	6	..	55·75	..	5	..	1	..	1	..	5	..	—
Bladder	..	2	..	48·2	..	1	..	1	..	1	..	1	..	—
Hard palate	..	1	..	69	..	1	..	—	..	1	..	—	..	—
Illeum	..	1	..	31	..	1	..	—	..	1	..	—	..	—
Thyroid	..	1	..	50	..	—	..	1	..	1	..	—	..	—
Uterus	..	1	..	35	..	—	..	1	..	—	..	1	..	—
Cæcum and ascending colon	..	1	..	30	..	1	..	—	..	1	..	—	..	—
Rectum	..	6	..	52·5	..	2	..	4	..	1	..	5	..	—
Messentery	..	1	..	22	..	—	..	1	..	—	..	1	..	—
Head of pancreas	..	2	..	48	..	1	..	1	..	1	..	1	..	—
Penis	..	33	..	48·5	..	33	..	—	..	24	..	5	..	4
Scrotum	..	2	..	48	..	2	..	—	..	2	..	—	..	—
Perineum and vulva	..	5	..	48·3	..	3	..	2	..	3	..	2	..	—
Cervix	..	14	..	51·1	..	—	..	14	..	2	..	11	..	1
Breast	..	17	..	40·6	..	8	..	9	..	10	..	5	..	2
Liver ..	..	2	..	60	..	1	..	1	..	—	..	2	..	—
Foot (following chronic ulcer)	..	1	..	56	..	1	..	—	..	1	..	—	..	—
Larynx and vocal cords	..	3	..	54	..	3	..	—	..	2	..	1	..	—
Neck ..	..	1	..	31	..	1	..	—	..	—	..	1	..	—
Groin	..	1	..	25	..	1	..	—	..	1	..	—	..	—
Hip ..	..	1	..	35	..	—	..	1	..	—	..	1	..	—
Leg at sight of amputa- tion	..	3	..	45	..	3	..	—	..	1	..	1	..	1
Submaxillary admo- cinoma	..	1	..	67	..	1	..	—	..	1	..	—	..	—

The total number of cases admitted to all the other hospitals in the Provinces was 104—67 males and 37 females—cancer of the jaw 11, tongue 9, cheek 34, lip 4, cervix uteri 13, uterus 2, breast 7, penis 18, liver 2, stomach 1, and groin 3. The average age was males 48·97, females 47·35.

It is of interest to note that of the total number of cases reported over 50 per cent. are of the buccal cavity. This is attributed to the prevalence of the habit of chewing betel.

22. *Anchylostomiasis*.—114,157 cases were treated at dispensaries during the year, and the following table of hospital admissions during the last four years indicates the relative prevalence and mortality of this disease in the various Provinces :—

	1920.		1921.		1922.		1923.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
General Hospital, Colombo ..	790 ..	111 ..	772 ..	135 ..	588 ..	81 ..	573 ..	134
Western Province ..	1,831 ..	287 ..	1,619 ..	250 ..	1,575 ..	156 ..	2,030 ..	137
Central Province ..	3,881 ..	714 ..	3,643 ..	584 ..	2,519 ..	281 ..	2,957 ..	270
Southern Province ..	1,461 ..	204 ..	1,348 ..	145 ..	1,418 ..	110 ..	1,222 ..	88
Province of Sabaragamuwa ..	1,599 ..	292 ..	1,728 ..	271 ..	1,579 ..	155 ..	2,128 ..	194
North-Western Province ..	402 ..	48 ..	529 ..	74 ..	754 ..	74 ..	809 ..	85
Province of Uva ..	1,076 ..	255 ..	968 ..	194 ..	827 ..	111 ..	869 ..	83
Eastern Province ..	144 ..	13 ..	59 ..	11 ..	111 ..	5 ..	225 ..	13
North-Central Province ..	112 ..	13 ..	197 ..	29 ..	42 ..	2 ..	155 ..	8
Northern Province ..	138 ..	6 ..	219 ..	29 ..	405 ..	7 ..	333 ..	15
Railway Extensions ..	— ..	— ..	— ..	— ..	— ..	— ..	43 ..	3
Total ..	11,414	1,945	11,082	1,721	9,822	982	11,344	1,030

These figures refer to cases of anchylostomiasis as the primary disease ; but owing to the almost universal infection of all hospital and dispensary patients, mass treatment for this disease was carried out during the year at dispensaries and the out-patient departments of hospitals and a large number of persons received necessary treatment.

Report submitted by Dr. J. F. Docherty of the Rockefeller Foundation :—

ANCHYLOSTOMIASIS CAMPAIGNS, SUMMARY FOR 1923.

The following Summary of Anchylostomiasis Operations for 1923 is based largely on the Quarterly and Annual Reports already submitted by the Field Directors.

1. *Organization*.—The organization of the Anchylostomiasis Campaigns for 1923 was similar in all details to that of previous years, viz., a separate Department working in conjunction with the Medical Department and directed by a Member of the International Health Board. The Director was advised by the Anchylostomiasis Campaign Committee consisting of the Colonial Secretary, Principal Civil Medical Officer, Sanitary Commissioner, representatives of Provincial Government, Estates, and Agents, and the Senior Members of the Anchylostomiasis Staff.
2. *Personnel*.—(1) No change was made in the International Health Board's representative in Ceylon, Dr. J. Frank Docherty remaining in charge.
- (2) Of the locally employed staff of five Medical Officers, Drs. Jayaram, Simon, Fernando, and Hall remained throughout the entire year, while Dr. Outschoorn was relieved by Dr. E. S. Godlieb on April 1, 1923.
- (a) Dr. Outschoorn (relieved by Dr. Jayaram, April 1) assisted by Drs. Hall and Simon was in charge of Unit No. 1.
- (b) Dr. Godlieb (who relieved Dr. Jayaram, April 1) assisted by Drs. Simon or Fernando was in charge of Unit No. 2.
- (c) Dr. Fernando directed activities of half unit No. 3.
- (3) The subordinate staff varied as will be noted in the following detailed list :—

Personnel.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
<i>Unit No. 1.</i>												
Directors ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1
Assistant Directors ..	1 ..	1 ..	1 ..	1 ..	1 ..	2 ..	2 ..	1 ..	1 ..	2 ..	2 ..	2
Clerks ..	2 ..	2 ..	2 ..	2 ..	2 ..	2 ..	2 ..	2 ..	2 ..	2 ..	2 ..	2
Dispensers ..	8 ..	8 ..	8 ..	8 ..	8 ..	12 ..	14 ..	10 ..	10 ..	12 ..	12 ..	12
Caretakers ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	2 ..	1 ..	1 ..	1 ..	1 ..	1
<i>Unit No. 2.</i>												
Directors ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1
Assistant Directors ..	1 ..	1 ..	1 ..	1 ..	1 ..	— ..	1 ..	1 ..	1 ..	— ..	— ..	—
Clerks ..	— ..	— ..	— ..	— ..	— ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1
Dispensers ..	8 ..	8 ..	8 ..	8 ..	8 ..	5 ..	9 ..	9 ..	9 ..	7 ..	7 ..	7
Caretakers ..	— ..	— ..	— ..	— ..	— ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1
<i>Half Unit No. 3.</i>												
Directors ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	—
Assistant Directors ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	— ..	1 ..	1 ..	1 ..	1 ..	1
Clerks ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	—
Dispensers ..	4 ..	4 ..	4 ..	4 ..	4 ..	4 ..	— ..	4 ..	4 ..	5 ..	5 ..	5
Caretakers ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	—
<i>Central Office.</i>												
Directors ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1
Assistant Directors ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	—
Clerks ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	2 ..	1 ..	2
Dispensers ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1
Microscopists ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1
Caretakers ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1 ..	1
Total ..	33	33	33	33	33	36	39	38	38	40	39	40

3. *Extent of Operations.*—(1) The intensive village treatment campaigns carried out in 1923 were confined solely to the Western Province, being located in areas selected and sanitated by the Sanitary Commissioner six months previous to the commencement of treatment measures. The districts treated were Siyane korale east, the northern half of Hapitigam korale, and Mahara district.

(2) The hospital-dispensary units visited all Government medical centres in Eastern and Central Provinces, and completed the visits in Northern and Uva Provinces. In addition a number of major dispensaries in Western, North-Western, Northern, and Southern Provinces received special assistance during the latter part of the year.

(3) A demonstration of the feasibility and the value of control of anchylostomiasis on estates was carried out on the North Matale group.

(1) *Village Campaigns: (a) Hapitigam Korale.*—Unit No. 1 under the direction of Dr. Outschoorn and assisted by Dr. Sam de Simon commenced treatment in northern half of Hapitigam korale on January 3, 1923; the subordinate staff consisted of eight dispensers, one clerk, one assistant clerk, and one peon. Operations progressed very favourably during January and February, but during the month of March, owing to an outbreak of malaria, the number applying for treatment rapidly decreased.

On April 1 Dr. Jayaram replaced Dr. Outschoorn, by which date the daily dispensary attendance had begun to show signs of improvement. The numbers rapidly increased and were so well maintained that the Director reported 90 per cent. of the population examined, treated, or exempted by July 1. On this date Dr. Jayaram with one half unit was transferred to Veyangoda, Dr. Simon remaining at Mirigama an extra month to complete second treatments.

In the Field Directors' final report for this campaign, 16,599 out of the population of 17,780 applied for treatment; of which number, 2,871 were exempted.

(b) *Siyane Korale East.*—This korale lies along the eastern border of the Western Province extending westward to within 17 miles of Colombo, northward 2 miles beyond the Kandy-Colombo road, and southward to the Kelani-ganga. It has an approximate population of 41,000 located in the 100 villages, none of which are of sufficient size to merit a Government Post or Telegraph Office. As in the Mirigama area the people are all Sinhalese villagers, whose occupations are farming, trading, or working, on the few coconut estates in the district.

Dr. Godlieb assisted by Dr. Hall was assigned to the district on June 1, the former being located at Pugoda in the southern half, while Dr. Hall established his office at Veyangoda in the northern half. During the month of June the Field Directors confined their attention to a general survey and a census although a number of treatments were administered during the last week of the month. As mentioned previously Dr. Jayaram was transferred to Veyangoda on July 1, while Dr. Fernando reported to Dr. Godlieb the same day thus making two complete units in the korale.

Rapid progress was made due to the activities of the staff and the assistance of the Assistant Government Agent and Mudaliyar Obeysekera, both of whom were ever ready to grant us any aid possible. Unfortunately for Dr. Godlieb's unit the south-west monsoon continued throughout July, August, and September, while the north-east started early in October with the result that many of his dispensaries could be visited by boat only, the entire southern half of the korale being inundated several times during the course of the campaign.

In spite of the difficulties encountered results were so satisfactory that it was decided to reduce the staff in the korale by one half unit, and on October 1 Dr. Godlieb was transferred to Mahara while Dr. Simon joined Dr. Jayaram's unit at Veyangoda.

On the completion of operations on December 18, of the total population as determined by our census 40,343, 37,066 availed themselves of the opportunity of securing free treatment, 31,023 being passed as physically fit. Of this number, 70·8 per cent. received second treatments.

It might be mentioned that although part of the Veyangoda district was treated in 1921 by the late Dr. G. G. Hampton, little difficulty was met in convincing the villager of the advisability of further treatment.

(c) *The Mahara Area.*—This area, with Ragama as its centre, lies between the Colombo-Kandy road and railroad, its western and eastern limits being marked by the 7th and 13th milepost.

This district was offered free treatment in 1920, but less than 10 per cent. of the population took advantage of the opportunity. Dr. Godlieb opened his office on October 1 and immediately the dispensaries became very popular. The returns were so satisfactory that the original area could easily have been completed by the end of the year, but as various headmen in neighbouring villages requested our assistance we enlarged the district. This necessitated two months extension of the contemplated treatment period.

Dr. Godlieb included the Mahara jail in this campaign, treating all prisoners with exceptionally good results, 94·5 per cent. being cured by one treatment.

(2) *Hospital-Dispensary Campaigns.*—The 1922 scheme of instructing Medical Officers and apothecaries in Government medical institutions was finished on July 1, 1923. Dr. Jayaram assisted by Dr. Hall completed the Northern Province by the end of February. This unit was then transferred to Central Province and remained there until June 1.

Dr. Fernando's half unit working separately visited all centres in Uva and Eastern Provinces by July 1, when it was temporarily transferred to Pugoda division of Siyane korale east. When Dr. Simon relieved Dr. Fernando on August 1, it was decided to assign the latter with one half unit to assist officers in charge of the major medical centres in various Provinces as time would permit. Dr. Fernando was first stationed in the North-Western Province, proceeding to Jaffna on October 1 to treat this section before the heavy rains of the north-east monsoon which commenced somewhat early in October. This necessitated a transfer to the Southern Province on November 1 and to the Western Province on December 1.

(3) *Estate Demonstration.*—The Superintendent and Manager of North Matale group having constructed an accepted hospital and approved compounds and latrines it was considered by this office to be a satisfactory estate for a demonstration of the feasibility of hookworm control and incidentally an opportunity to conduct certain investigations.

The Director for Ceylon personally took charge of all treatments, examinations, and blood-counts. These were completed during the month of April. Are-examination, November 1 to 8, demonstrated a certain degree of re-infection, but in addition gave evidence of a decided improvement in the health of the coolies as shown by blood-counts, hemoglobin tests, hospital and dispensary records, and the daily muster.

As this demonstration was not completed by the end of the year no definite reports are available.

4. *Activities of Government Institutions.*—As a result of the hospital-dispensary campaign the various Government Medical Officers and apothecaries have obtained a new view of anchylostomiasis and have been convinced that treatment of this infection eliminates a large number of lesions which previously were treated as specific diseases. This has encouraged the medical division considerably with the result that during the year the 240 medical centres treated 501,537 out-patients for hookworm disease.

5. *Estate Activities.*—Reports for the first ten months of 1923 from estate dispensaries demonstrate either a reticence on the part of the dispensers and Medical Officers to submit returns or a lack of interest in hookworm disease as only 18,000 treatments were recorded. It is, of course, acknowledged that a fair percentage of estates are not supplied with privately employed Medical Officers, their labour being treated at Government medical centres. In spite of this the number treated does not seem satisfactory when one considers that there are 480 Medical Officers or apothecaries employed by estates.

6. *Sanitation : (a) Village Areas.*—Due to the activities of the staff of the Sanitary Commissioner all areas selected for intensive treatment and treated during the year were practically sanitated before our units commenced operations. In each case the Sanitary Commissioner having selected an area for our campaign immediately assigned sufficient Inspectors to satisfactorily prepare the district within a period of six months. The latrine constructed by the villager is invariably of the pit type, as this is the most practicable and incidentally the least expensive. In a few cases the wealthier villagers constructed pail latrines but the number noted has been exceedingly small since conservancy is an item the average villager is unable to afford. The latrines have been so constructed that they last at least three to four years ; the floor is either of cement over corrugated iron or hard wood planks, the walls of brick or mud and wattle, while the roof is invariably of cadjan though a few were tiled. The latter is undoubtedly the better construction, but cadjan if changed twice annually is extremely effective in keeping the walls free from monsoon rains, which is chiefly responsible for early destruction of the walls. The reports received from the Sanitary Commissioner's Office give the following data on latrine construction in areas treated during 1923 :—

	Division.	
	Hapitigam Korale.	Siyane Korale East.
Date sanitation started	.. July 1, 1922	.. January 1, 1923
Number of latrines built before pre-sanitary campaign..	.. No record available..	1,971
Latrines built previous to treatment ..	1,393	.. No record available
Latrines built on completion of treatment ..	2,689	.. 4,234
Homes supplied with latrines ..	78·6 per cent.	.. 79 per cent.
Date treatment campaigns started ..	January 1, 1923	.. July 1, 1923
Date treatment campaign finished ..	August 1, 1923	.. December 18, 1923
Treated or exempted ..	93·61 per cent.	.. 92·5 per cent.

(b) *Estate Sanitation.*—At the meeting of the Anchyostomiasis Campaign Committee on May 2 it was decided to give a further demonstration of hookworm control on a group of estates. The Gampola-Nawalapitiya-Dolasbage-Mawanella-Peradeniya area was selected on the advice of the Inspecting Medical Officer, Central Province. This area was visited early in December by the Director for Ceylon and the Inspecting Medical Officer when sanitary conditions were found unsatisfactory. Although the staff of the Sanitary Commissioner had not lost any time in securing the construction of a fair percentage of latrines, the estates with but a few exceptions were indifferent to the requests of the Inspecting Medical Officer to instal adequate latrine accommodation for their lines or to reconstruct compounds, lines, and water supplies. In view of the unsatisfactory condition of the estates this estate-village project was cancelled on December 10, 1923. Although the above conditions do exist they are confined to a few small areas. In the majority of the up-country tea estates the lines, latrines, compounds, and general improvements carried out at the request of Government and according to approved plans are most encouraging. The expenditure of money by estates or their agents during 1923 in improving the health of the cooly is estimated to approximate 15 million rupees. 7. *Laboratory Report.*—The following is a detailed report of the examinations carried out by the staff of the central laboratory :—

Month.	Preliminary Examina-tion.		First Examina-tion.		Second Examina-tion.		Third Examina-tion.		Fourth Examina-tion.		Total.		Grand Total.
	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.	
January	.. 25	.. 8	.. 2	.. 5	.. —	.. —	.. —	.. —	.. —	.. —	.. 27	.. 13	.. 40
February	.. 2	.. 4	.. 1	.. 1	.. 3	.. 1	.. —	.. —	.. —	.. —	.. 6	.. 6	.. 12
March	.. 339	.. 6	.. 12	.. 14	.. —	.. —	.. —	.. 3	.. —	.. —	.. 351	.. 23	.. 374
April	.. 584	.. 4	.. 2	.. 8	.. 1	.. —	.. —	.. —	.. —	.. —	.. 587	.. 12	.. 599
May	.. 5	.. 9	.. 7	.. 4	.. —	.. —	.. —	.. —	.. —	.. —	.. 12	.. 13	.. 25
June	.. 32	.. 40	.. 1	.. 30	.. 1	.. 7	.. 1	.. 3	.. 1	.. —	.. 36	.. 80	.. 116
July	.. 2	.. —	.. 1	.. —	.. —	.. 1	.. —	.. 5	.. —	.. —	.. 3	.. 6	.. 9
August	.. —	.. 3	.. 3	.. —	.. —	.. —	.. 1	.. 12	.. —	.. 1	.. 4	.. 16	.. 20
September	.. —	.. 2	.. 21	.. 13	.. —	.. —	.. —	.. —	.. —	.. —	.. 21	.. 15	.. 36
October	.. 2	.. 1	.. 18	.. 24	.. 41	.. 54	.. —	.. —	.. —	.. —	.. 61	.. 89	.. 150
November	.. —	.. —	.. 31	.. 431	.. 83	.. 123	.. —	.. —	.. —	.. —	.. 114	.. 554	.. 668
December	.. 1	.. 5	.. 3	.. 44	.. —	.. —	.. —	.. —	.. —	.. —	.. 4	.. 49	.. 53
	992	82	102	574	129	196	2	23	1	1	1,226	876	2,102
Total number of specimens centrifuged .. 1,009: Positive 41, Negative 968													
Total number of specimens examined by salt flotation method .. 968: Positive 92, Negative 876													

8. *Education : (a) Sanitary Campaign.*—The Sanitary Commissioner during his preparatory campaign gave a series of lectures to the headmen of the district training them as Sanitary Inspectors. At the completion of the lectures examinations were given, and all who passed were appointed Government Inspectors without pay by the Government Agent. (b) *Campaign Measures.*—The system of education was as follows:— (1) Illustrated lectures and demonstrations to the headmen of the areas, the Mudaliyar acting as Chairman and Interpreter. (2) Illustrated lectures and demonstration to the villagers, the Headmen acting as Chairman and Interpreters to better convince the audience. (3) Distribution of illustrated pamphlets in English and the vernacular. (4) Lectures and reading of literature by dispensers to groups of villagers at dispensaries and markets. (5) The employment of a travelling demonstration which showed the entire life-history of the hookworm under the microscope. Use was made of the Baermann apparatus and Chamois Leather Penetration Test, as devised by the Director for Ceylon, so that the villager could see the actual life and activities of the hookworm. In addition, illustrated charts and pamphlets in the vernacular were at the disposal of those present. These demonstrations were given at markets, schools, dispensaries, and other centres where people congregated.

9. *Drugs used.*—During the first two months of the year chenopodium was used solely. After March 1 when a sufficient supply of carbon tetrachloride became available this drug was introduced, it being used first on adults and later on children in combination with chenopodium in proportion of 5 of carbon tetrachloride to 1 of chenopodium. This was necessary since carbon tetrachloride was found to be very ineffective in the removal of ascaries.

The following dosage was used :—

- 2–12 years, twice the age in mins. of a 5 to 1 carbon tetrachloride chenopodium mixture.
- 12–18 years, twice the age in mins. of carbon tetrachloride.
- 18–40 years, average dose 40 mins., maximum 45, carbon tetrachloride.
- 40–50 years, 30 to 40 mins. carbon tetrachloride.
- 50–55 years, 20 to 30 mins. carbon tetrachloride.

10. *Official and other support.*—The Anchylostomiasis Campaign in Ceylon receive the assistance and co-operation of a large number of Government officials and public spirited private individuals. Although it is impossible to mention all persons concerned, still we feel that acknowledgment of the courtesies granted by the following should be mentioned :—The Principal Civil Medical Officer ; the Assistant Principal Civil Medical Officer and departmental staff ; the Government Agent and Assistant Government Agent, Western Province ; the Sanitary Commissioner and staff ; the Director of Education and staff ; the Provincial Surgeons ; the Mudaliyars of Hapitigam and Siyane korale east, as well as various arachchies and headmen in the districts.

Summary of Treatments.

			1st Treatments.	Total.
1. (a) Village campaigns:—				
Hapitigam korale .. ..	..	..	17,279	28,581
Siyane korale east .. ..	..	..	16,711	31,195
Siyane korale “ Pugoda area ” .. ..	..	..	14,312	21,919
Mahara area .. ..	..	..	7,499	12,070
			<hr/> 55,801	<hr/> 93,765
2. Central Office .. ..	..	..	37	41
3. Estate treatment .. ..	..	..	1,337	2,511
4. (b) Itinerating work :—				
<i>Dr. Fernando's Half Unit.</i>				
January to March, 1923 .. ..	..	..	1,500	1,546
April to June .. ..	..	..	5,014	5,553
August to September .. ..	..	..	9,693	12,427
October to November .. ..	..	..	2,613	4,350
November to December .. ..	..	..	5,057	7,395
<i>Dr. Jayaram's Unit.</i>				
January to February .. ..	..	..	7,858	8,770
February to March .. ..	..	..	6,852	7,436
April to May .. ..	..	..	3,746	4,356
			<hr/> 42,333	<hr/> 51,833
5. Reports from dispensers controlled by Central Office—				
Avissawella .. ..	..	..	185	188
Eheliyagoda .. ..	..	..	89	93
Rakwana .. ..	..	..	15	15
Balangoda .. ..	..	..	132	134
Female Outdoor Dispensary .. ..	..	..	844	969
			<hr/> 1,265	<hr/> 1,399
6. Government hospital and dispensary units—				
Total number of treatments given in the Western Province ..	..	..	74,539	93,652
Total number of treatments given in the Southern Province ..	..	..	62,823	137,678
Total number of treatments given in the Central Province ..	..	..	62,905	71,270
Total number of treatments given in the North-Western Province ..	..	..	112,414	137,181
Total number of treatments given in the Province of Uva ..	..	..	18,472	20,118
Total number of treatments given in the Province of Sabaragamuwa ..	..	..	98,586	118,149
Total number of treatments given in the Northern Province ..	..	..	43,410	52,632
Total number of treatments given in the Eastern Province ..	..	..	8,191	9,415
Total number of treatments given in the North-Central Province ..	..	..	20,197	23,903
			<hr/> 501,537	<hr/> 664,008
7. Estate treatment .. ..	..	..	18,000	18,000
			<hr/>	<hr/>
Grand Total ..	..	..	620,310	831,557

23. *Tubercular Disease of the Lungs (Pulmonary Phthisis).*—The number of hospital cases treated during the year was 4,099 with 990 deaths, as against 3,308 cases with 865 deaths in 1922, 3,353 cases with 881 deaths in 1921, and 2,870 cases with 660 deaths in 1920. The provincial distribution of hospital cases treated in 1923 was as under :—

	Cases.	Deaths.		Cases.	Deaths.
General Hospital, Colombo ..	550	257	Southern Province ..	335	29
Lunatic Asylum, Colombo ..	119	54	North-Western Province ..	178	53
Western Province ..	2,124	355	North-Central Province ..	35	10
Central Province ..	250	85	Province of Uva ..	120	32
Northern Province ..	58	11	Province of Sabaragamuwa ..	267	87
Eastern Province ..	61	17	Railway Extensions ..	2	—

The Western Province cases include patients from all the Provinces who come to Colombo, Kandana, and Ragama for treatment.

The percentage of deaths to total treated during the year was 24·15, and the Registrar-General's returns gives a total of 3,322 deaths, as against 3,108 registered the previous year.

Three special institutions—The Anti-Tuberculosis Institute, Colombo, the Kandana Sanatorium for early cases, and the Ragama Tuberculosis Hospital for advanced and chronic cases—are maintained to deal with this disease. A large number are yearly admitted to the tuberculosis wards of the General Hospital, Colombo, for want of sufficient accommodation at Ragama.

At the Institute in Colombo.—The number of new cases seen was 3,565, as compared with 3,000 in 1922, 2,785 in 1921, and 2,196 in 1920. Of these, 899 cases were sent to the hospital at Ragama and 277 to the sanatorium at Kandana.

At the Kandana Sanatorium.—250 cases were admitted (145 males and 105 females) and these with 40 remaining on December 31, 1922, made a total of 290 cases treated during the year.

Of the admissions, 222 were from the Western Province, and of the total number treated 233 were discharged, 12 were transferred to Ragama, 2 died, and 55 remained on December 31, 1923. The average duration of stay in hospital of each patient was 56 days. Of those discharged, in 44 the disease was arrested and in 30 there was no improvement, 29 were reported as improved and 118 much improved.

At the Chronic Hospital, Ragama (183 beds for males and 103 for females).—The total number of patients treated during the year was 1,308, and the total number of deaths 250, or 19·18 per cent. of the number of cases treated.

The accommodation was increased, and two wards of 20 beds each were under construction during the year, but further accommodation is needed for consumptives and should be provided in the other Provinces. Funds have been provided for the erection of a hospital and sanatorium in the Northern Province.

24. *Leprosy.*—Two asylums are maintained in the Island for the segregation of lepers under the Lepers Ordinance, No. 4 of 1901. At Hendala in the Western Province and Mantivu island in the Eastern Province.

The lepers are nursed by Religious Sisters with the help of male and female attendants at both asylums.

There were 116 lepers at Mantivu island on December 31, 1922. 58 were admitted during the year under review (and of these, only 12 were new cases), 13 died, and 47 were discharged or absconded. 114 remained on December 31, 1923.

The report of the Medical Superintendent in charge of the Asylum at Hendala gives the following figures for the year under review :—

	Males.	Females.	Total.
Remained on December 31, 1922	406	97	503
Admitted during 1923	125	19	144
Discharged during 1923	59	8	67
Died during 1923	51	13	64
Remained on December 31, 1923	421	95	516

Of the 144 admissions, 110 were new cases; and of these, 20 were of the tubercular type, 39 of the anæsthetic type, and 51 of the mixed type of the disease. The new admissions were from the following Provinces:—Western 53, Central 15, Southern 16, North-Central 3, North-Western 5, Sabaragamuwa 13, Uva 3.

Of the 67 patients “ discharged ” from the asylum, 14 were granted permits for home isolation, 8 Indian Tamils were repatriated to India, and 45 absconded.

Of the absconders, 30 returned of their own accord or were brought back by the Police, and 15 are still at large.

The percentage of deaths to total number of inmates in the asylum during the year was 9·89.

The Medical Superintendent reports 79 lepers were treated during the year with E C C O, the recently discovered treatment for leprosy, and that the results have not been as discouraging as in the past. In tubercular cases, if taken in hand early and if the patients are of a robust constitution, there is a marked diminution in the size of the nodules and rapid softening of the skin. The best results are in the anæsthetic cases—sensation and colour of affected areas rapidly return. In all cases there is improvement in general health.

A female patient was discharged on parole, as she was apparently cured, and is being kept under observation. Four cases have shown such marked improvement under the treatment that it is hoped to be possible to discharge them as cured at an early date. It is expected that these results will encourage patients in the first stage of leprosy to seek treatment.

About four-fifths of the lepers in the asylum are in the last stage of the disease and of the advanced crippled nerve type, and these can only hope for some improvement in their general health from the new treatment.

25. *Parangi (Frambæsia, or Yaws).*—The number of hospital admissions was 9,748 with 32 deaths, as against 13,545 admissions in 1922. The decrease in the number of hospital cases during the year was due to intensive campaigns by three Itinerating Medical Officers and the treatment by modern methods weekly of a large number of out-patients brought by headmen to, and voluntarily seeking treatment at, dispensaries and the out-patient departments of hospitals. The distribution of the disease judged from hospital returns is shown in the following table :—

	1920.	1921.	1922.	1923.
General Hospital, Colombo	102	267	306	436
Western Province	601	1,096	1,499	770
Central Province	1,275	1,202	1,312	1,194
Northern Province	157	102	504	387
Eastern Province	749	791	646	465
Southern Province	783	1,093	5,085	2,672
North-Western Province	659	711	784	645
North-Central Province	301	374	594	696
Province of Uva	733	684	594	731
Province of Sabaragamuwa	824	1,841	2,221	1,741
Railway Extensions	—	—	—	11
Total	6,184	8,161	13,545	9,748

The dispensary cases as regards Provinces were as follows:—

Western	3,393	North-Western ..	12,254
Central	2,942	North-Central ..	19,185
Northern	866	Uva ..	1,871
Eastern	5,050	Sabaragamuwa ..	2,397
Southern	8,501		

Dr. J. A. E. Corea, a private practitioner, visited Hettipola, Kanjukkulia, and Madampe in the Chilaw District, and treated 260 cases of parangi during the year with drugs supplied by Government.

Three Medical Officers on parangi duty itinerated in the Southern Province, in the Western Province, and the Kuruvita korale of Sabaragamuwa, and in the Eastern Province, and treated 16,815 cases; a large number of these patients attended a second and a third time, and a total number of 30,139 injections were given during the campaign in 1923.

The incidence of parangi is very large, the disease is scattered over all the Provinces, and a census showed that about 150,000 cases have to be dealt with. Six Itinerating Medical Officers have been provided for in the 1923–24 Estimates, and it is hoped that in a few years all these patients will have received proper treatment.

26. *Plague*.—There were 232 cases (Colombo town 230, Wellampitiya near Colombo 1, and Talaimannar 1) in 1923 with 211 deaths, a mortality-rate of 90·94 per cent., as against 160 cases with 150 deaths in 1922, 187 cases with 171 deaths in 1921, and 369 cases with 316 deaths in 1920. Of the 232 cases reported during the year, 84 males and 13 females were admitted to the Infectious Diseases Hospital, Colombo; and of the total treated during the year, 15·68 per cent. recovered.

27. *Port Health Precautions*.—During the year 2,363 British and foreign steamers and 285 native sailing vessels called at the port of Colombo and were inspected, as against 2,323 steamers and 281 sailing craft in 1922.

Five steamers were placed in strict quarantine, as they had cases of smallpox on board, one on each ship. These cases were landed and sent to the Infectious Diseases Hospital. Two cases of smallpox occurred among passengers soon after their arrival in the Island from India *viâ* Tuticorin.

Only two cases of chickenpox were landed in 1923. The number vaccinated during the year was 9,581, mostly arrivals from India *viâ* Tuticorin.

Samples of water from the water boats sent for analysis during the year were good and up to the standard of water as supplied from the meter.

The Quarantine Dépôt was improved during the year, the floor was cemented, additional lights were supplied, and cots were provided. There is ample accommodation now, and the crews are more comfortable and happier than they were when housed in a hulk in the harbour. Disinfection of 146,206 persons and their clothing was carried out at the port disinfecting station.

At the Port Venereal Clinic for Seamen 68 cases of syphilis were treated by intra-venous injections, as against 82 cases in 1922.

SECTION III.—THE SANITARY BRANCH OF THE MEDICAL DEPARTMENT.

28. The following report for the year is submitted by Dr. J. F. E. Bridger, Sanitary Commissioner :

Staff of the Sanitary Branch.—A Sanitary Commissioner, an Assistant Sanitary Commissioner, 7 Medical Officers of Health, a Sanitary Engineer, Sanitary Superintendent, 3 Supervising Sanitary Inspectors, 129 Sanitary Inspectors, 10 disinfecting orderlies, 4 survey coolies attached to the Sanitary Engineer, a rat-gang consisting of an overseer and 3 coolies, and a gang of 10 coolies under a kangany attached to the Railway Sanitary Inspector doing anti-malarial work.

2. *Additional Appointments and Transfers*.—Dr. John R. Blaze, Medical Officer of Health, Kalutara District and Southern Province, left for England in order to obtain British qualifications on August 16, 1923, and Dr. G. W. R. Fernando, attached to the Head Office, succeeded him.

Dr. S. F. Chellappah, Medical Officer of Health, Central Province, who was awarded a scholarship by Government under the International Health Board Fellowship Scheme, Rockefeller Foundation, left for the United States of America on August 21 last, and is prosecuting his studies in special Public Health subjects at the School of Public Health, Harvard University. He was succeeded by Dr. D. C. de Fonseka, Medical Officer of Health, Railways, on September 15, 1923. Dr. W. T. de Silva was appointed Medical Officer of Health, Railways. Dr. S. Somasundaram who had been attached to the Head Office reverted to the Medical Department proper, and was appointed Assistant Pathologist, General Hospital, in September.

3. Dr. M. de Costa, Medical Officer of Health, Western Province A Division, was appointed a member of the Urban District Council, Negombo, on May 3, 1923.

Dr. S. F. Chellappah, Medical Officer of Health, Central Province, was nominated a member of the Urban District Council, Matale, on May 2, 1923.

The designation “Sanitary Officer” was changed to “Medical Officer of Health” with the approval of Government, as the latter is the generally recognized title for Medical Officers engaged in public health work.

4. In my last report reference was made to the need for an extension of the influence of the Department to those Provinces not yet provided with Medical Officers of Health. Provision was made in the 1923–24 Estimates for 4 Additional Medical Officers of Health, for whose services there is a crying need.

Advertisements both in the local press and in the British Medical Journal for applications from qualified Ceylonese for these appointments have up to the present met with no response. It is suggested that these appointments, which require special qualifications in public health and which do not carry with them the privilege of private practice, are not sufficiently attractive to local candidates who unfavourably contrast the emoluments and prospects with those of the curative branch of the Department.

5. *Sanitary Inspectors*.—Forty Sanitary Inspectors were appointed during the year.

6. *Clerical Staff*.—Messrs. K. B. L. J. de Silva and A. C. S. R. Senaratne, two clerks in Class II. of the Clerical Service, were appointed on July 16, 1923, to relieve Messrs. M. C. Ernest and H. C. K. Jayawardane who qualified as Sanitary Inspectors and were given appointments.

7. *Training Class*.—A class for the training of Sanitary Inspectors was started in January with 40 students. The course of instruction lasted six months, at the end of which the qualifying examination was held.

The course of instruction is both theoretical and practical. The former is given by means of lectures and the latter by daily fieldwork under Sanitary Inspectors in the Colombo District, by demonstrations, and by attendance at Police Courts to learn procedure in conducting sanitary prosecutions. The syllabus includes the following subjects :—Elementary Human Physiology, Elementary Chemistry and Physics, Water, Air, Soil, Food and Diet, Climate, Personal Hygiene, Disposal of Refuse, Disposal of Human Waste Products, Infectious Diseases and their Prevention, Insect Carriers of Disease, Disinfection, Sanitary Law, Minor Sanitary Engineering.

8. Tuition in each subject is given by a member of the staff of the Sanitary Branch, with the exception of the Lectures and Demonstrations in Malaria Prevention.

Mr. Carter, the Malariologist, the services of whom as a recognized authority the Colony is fortunate in possessing, very kindly at my request took the classes in this subject.

Monthly examinations are held during the course of training, and students who do not show satisfactory progress are discontinued. The standard of knowledge required for a pass in the qualifying examination for Sanitary Inspector, which is held at the end of the course, is a high one.

9. Thirty students qualified for appointment as Sanitary Inspectors; of this number, 16 were appointed by this branch and 2 by the Malariologist. Two of the men who qualified are Inspectors in the service of local sanitary authorities.

It is worth noting that the career of Sanitary Inspector seems to be particularly attractive to young men, as there were no less than 952 applicants for 25 places in the sanitary learner's class advertised for. Among the applicants were men of quite superior type, but the task of selecting suitable men with the necessary education, moral character, personality, and physique was a very difficult one.

10. *Distribution of Staff.*—The following officers are stationed in Colombo :—The Sanitary Commissioner ; Assistant Sanitary Commissioner ; the two Medical Officers of Health of the Western Province (excluding Kalutara District) ; Medical Officer of Health, Railways ; Sanitary Engineer ; and Sanitary Superintendent. The Medical Officer of Health, Central Province, has his headquarters at Kandy since Dr. de Fonseka was appointed to the post. The Medical Officer of Health in charge of Kalutara District and Southern Province is stationed at Kalutara. The total number of Sanitary Inspectors on the staff was 132 distributed as follows :—Western Province 71, Southern Province 12, Central Province 19, Northern Province 6, Eastern Province 5, Province of Sabaragamuwa 6, North-Western Province 3, Province of Uva 2, and Railway Sanitation 8.

The rat-gang has been working in the following suburbs of Colombo :—Dehiwala, Cotta, Welikada, Nugegoda, Kolonnawa, and Peliyagoda. In addition, the services of the gang were lent to the Urban District Council of Negombo for a short period after a case of plague had occurred in that town.

11. *Summary of Work Done.*—During the year 300,214 premises were inspected ; of which, 68,919 were found insanitary, and necessary action was taken. 3,693 prosecutions were entered for breaches of sanitary rules and regulations, and in the majority of cases convictions were obtained. The fines recovered amounted to Rs. 10,451·95. 15,653 notices were served calling upon householders to remedy sanitary defects ; in the case of 8,622 of these the requirements of the notices were voluntarily complied with, while in the case of the rest persuasion was required.

12. *Buildings : New and Reconstructed.*—In all 2,211 building applications were dealt with, and plans for 769 new buildings were approved of as conforming to requirements of Housing Ordinance. The largest number of applications was from the small towns of the Western Province.

13. *Infectious Diseases.*—The following infectious diseases were reported to this Department which took necessary action in regard to prevention :—

Chickenpox	..	2,123	Enteric fever	..	709	Phthisis	..	62
Diphtheria	..	7	Measles	..	575	Plague	..	6
Dysentery	..	1,649	Mumps	..	12	Smallpox	..	65

These cases have been reported from only the Western, Southern, Central, and Sabaragamuwa Provinces.

14. *Dysentery.*—There was an unusual prevalence of this disease during 1923, 1,649 cases having been reported, as against 748 the previous year. The disease was particularly prevalent in the Western and Southern Provinces. In the Western Province there was an outbreak at Gampaha and some of the villages in the vicinity in September and October ; in all 48 cases were reported with 8 deaths.

In this outbreak the spread of the disease was attributed to faulty methods of disposal of infected stools and flies which were abundant at the time. Removal of some of the cases to hospital, sanitary disposal of excreta of others, and measures dealing with the fly- nuisance resulted in abatement of the outbreak.

In the Southern Province the outbreaks occurred in Elpitiya and Akuressa ; they were of a more serious nature and assumed the proportions of an epidemic.

The epidemic in Elpitiya district broke out during the latter part of June, it was most severe during July and August and gradually abated thereafter. By November the epidemic was at an end, but sporadic cases were reported during December and early part of January of the current year.

15. Twenty-seven villages and several estates in the district were affected ; in all 208 cases were reported of which, 59 died. The Sanitary Inspector in charge of the area, with the assistance of the police headmen, took all necessary preventive measures. The Medical Officer of Health, Kalutara, and the Supervising Sanitary Inspector paid periodical visits to the infected area and satisfied themselves that everything possible was being done. The disease is said to have been introduced into the district from outside, and owing to existence at the time of conditions favourable to its spread it assumed epidemic proportions. The almost continuous wet weather that prevailed last year had destroyed paddy crops, resulting in scarcity of food among villagers. The heavy rains had also the effect of raising the level of the subsoil water, thus rendering the unprotected shallow wells, the source of supply of drinking water, more liable to surface pollution from stools of patients which are usually thrown into the back garden mixed with a little earth or paddy husks.

16. The Akuressa outbreak lasted from July to December, no less than 38 villages being affected. The total number of reported cases was 497 with 104 deaths. Two Inspectors were ordered for work in this area under the supervision of the Medical Officer of Health, Kalutara, and the Supervising Sanitary Inspector who visited the affected villages from time to time. The Assistant Government Agent, Matara, the Mudaliyars, and minor headmen rendered valuable assistance to the officers on duty. Dysentery was prevailing in Matara town and surrounding villages in sporadic form from an earlier period, and people who had frequent communication with these areas introduced the disease into their villages where water supply and disposal of excreta were very unsatisfactory. The water supply of most of these villages is derived from the Nilwala-ganga, which is also used for bathing and washing purposes. A few unprotected shallow wells exist in the villages away from the river. Owing to the heavy rain which prevailed there were repeated floods destroying crops and infecting sources of water supply.

Owing to the periodical floods water supplies were repeatedly polluted, and until special measures were taken to disinfect stools before disposal, and the use of boiled water for drinking purposes was insisted on, there was no abatement of the epidemic. Access to some of the affected villages was rendered difficult by floods, which made roads and paths impassable, thus hampering prompt action being taken.

17. *Enteric Fever*.—This disease too prevailed to a greater extent than in the previous year; 709 cases having been reported, as against 561 in 1923. The greater prevalence of the disease is attributable to the same contributory causes as dysentery, a similar infective bowel disease. In the houses of the poorer classes conditions are such that home isolation is practically impossible and contact infection is more common, the disease being more protracted and the patient more helpless than in the case of dysentery. Insanitary methods of disposal of infective excreta and prevalence of flies were also factors in the spread of the disease. The endemic centres of the disease are chiefly in the Western and Southern Provinces, and outbreaks of varying severity occur from time to time in and around these centres.

18. One such outbreak occurred in Kolonnawa and Wellampitiya, two adjacent suburbs of Colombo, which have become very populous in recent years chiefly owing to erection of the Petroleum Installation at Kolonnawa. The inhabitants are mainly of the cooly and artisan class and live under insanitary conditions of bad housing, water supply liable to pollution, and faulty methods of disposal of excreta.

During this outbreak 22 cases were reported with 7 deaths. The measures that were adopted to deal with the outbreak included disinfection of stools and their sanitary disposal, disinfection of wells, and cleaning up of house compounds.

19. The chief difficulties in dealing with this disease are non-notification of cases, ignorance of the people in regard to the infectious nature of the disease, and the impracticability of home-isolation. It is suggested that where home-isolation is not possible compulsory removal to hospital should be enforced in the interests of public health.

20. *Plague*.—Seven cases were reported from different parts of the Western Province; in each case it was found that infection had been acquired in Colombo.

No cases of bubonic plague occurred in Galle during the year. From this it may be inferred that the preventive measures taken during the outbreak of 1922 were effectual and that no fresh infection of the rat population has occurred.

In view, however, of the continued direct importation of rice into Galle from plague infected ports in India, the everpresent possibility of a re-infection from that source has to be kept in mind by the local health authority. Under these circumstances the Municipality cannot afford to permit any relaxation of measures of prevention, whether directed to the control of the rice trade or otherwise. Eternal vigilance is the only safeguard.

21. *Smallpox*.—In May, 1923, an outbreak of smallpox occurred at Horetuduwa in Kalutara District; the disease had been prevailing in the village for some time and had been treated as chickenpox, which was also in existence at the time. When search was made on the recognition of the disease 6 cases were detected in six different houses. Ultimately it was found that several villages with a circumference of about 10 miles had been affected and drastic action had to be taken.

In all 21 cases with 2 deaths were recorded after the disease was recognized. Six Inspectors, several vaccinators, and disinfecting orderlies were ordered for duty; the cases were treated at the Infectious Disease Hospital, Colombo, and the contacts were also removed to the contact camp in Colombo. The preventive measures were supervised by the Medical Officer of Health, Kalutara, and the Supervising Sanitary Inspector. The Assistant Sanitary Commissioner also paid several visits to the infected area and had general oversight of the work. The Totamune Mudaliyar, police headmen, and local police rendered valuable help, and the outbreak was soon stamped out.

In January, 1923, two cases of smallpox were reported from a village near Maggona; infection was traced to Kandy, where a serious outbreak of the disease had occurred.

22. *Sanitary Conveniences: Public Latrines*.—During the financial year 1922–23 twenty-four public latrines were built by Local Boards and Sanitary Boards throughout the Island.

The location of the latrines is as follows:—

Western Province	..	5	North-Central Province	..	2
Southern Province	..	3	Eastern Province	..	2
Central Province	..	3	Province of Uva	..	2
Northern Province	..	3	Province of Sabaragamuwa	..	1
North-Western Province	..	3			

Government contributed a sum of Rs. 30,000 towards the cost of the above.

23. *Private Latrines*.—The number of private latrines built during the year in each Province is as follows:—

Province.	Pit.	Dry-earth.	Total.
Western	20,216	1,206	21,422
Southern	2,565	31	2,596
Central	683	400	1,083
Sabaragamuwa	34	46	80
North-Western	51	111	162
Eastern	—	57	57
Uva	28	24	52
Northern	8	6	14
	23,585	1,881	25,466

24. *Disposal of Human Excreta*.—In Local Board towns and in the larger Sanitary Board towns the dry-earth system of conservancy is in force, the nightsoil being trenched or buried. In the Western Province the dry-earth system is being gradually introduced replacing pit latrines. The greatest obstacle to the introduction of bucket latrines is the inability of the majority of householders to pay the monthly conservancy fee which is usually Re. 1. In the Sanitary Board town of Ambalangoda private latrines are conserved free, the assessment rates being slightly increased to cover expenses. This is the more equitable method and is recommended for general adoption in the interests of public health, as the introduction of the more sanitary system of dry-earth conservancy will be greatly facilitated thereby.

25. *Domestic Water Supplies*.—During the year 41,362 wells were inspected; and of these, 15,686 were found to be unprotected and liable to pollution, 1,826 wells were improved. The provision of a pipe borne supply of pure water is urgently wanted in all Local Board towns and in the larger Sanitary Board towns of the Western Province.

Twenty-nine samples of water were examined chemically by the Government Analyst and 9 samples bacteriologically by the Director, Bacteriological Institute, at the request of the Sanitary Commissioner. Twenty-five of the samples examined were found unfit for drinking purposes and suitable action was taken to improve the source of supply.

26. *Scavenging.*—Arrangements are in force in the various Local Board and Sanitary Board towns throughout the Island for the collection and disposal of public and domestic refuse. In the majority of towns scavenging is carried out by contractors, and considerable supervision is required to get the work done efficiently. As pointed out in previous reports dumping of refuse and its use as manure for grass fields or coconut plantations especially within town areas or in their vicinity is insanitary owing to the breeding of flies which takes place in such deposits. In Ceylon where infective bowel diseases disseminated by flies, such as enteric fever and dysentery are common, special care should be taken to prevent fly-breeding. The incineration of refuse will prevent breeding of flies and this method is recommended for adoption as is being done in the Central Province. It is a matter for regret that there are no refuse incinerators in the Local Board and Sanitary Board towns of the progressive Western Province.

27. *Licensed Trades.*—The regulations for the control of licensed trades were applied more strictly during the year under review, particularly in the Western Province. In the case of existing licensed premises only essential requirements are insisted upon before issue of license is recommended, but in the case of new applications all the requirements of by-law have to be complied with in order to obtain a license. The Suburban Dairies and Laundries Ordinance is now applicable to all Local Board and Sanitary Board towns, but only a few towns have taken advantage of this measure to get dairies supplying them with milk improved.

There is a large number of unlicensed laundries in the suburbs of Colombo, but it is almost impossible to detect them as proof that the dhoby washes for residents in Colombo is required before legal action can be taken. However an increasing number of applications for laundry license are received, and licenses are recommended when the essential requirements are complied with.

28. The following is a statement of applications for licenses dealt with by Sanitary Inspectors in Western, Southern, Central, Eastern, Uva, Sabaragamuwa, Northern, and North-Western Provinces :—

		Number of Applications.			
		Received.	Recommended.	Not Recommended.	
Bakeries	..	289	258	..	31
Tea and coffee boutiques	..	772	726	..	46
Eating-houses	..	209	197	..	12
Public galas	..	67	56	..	11
Manure stores	..	30	28	..	2
Soap manufactory	..	1	1	..	—
Hide stores	..	3	3	..	—
Lime kilns	..	26	23	..	3
Brick kilns	..	37	31	..	6
Dairies	..	65	47	..	18
Cabook quarries	..	2	2	..	—
Plumbago sheds	..	2	2	..	—
Metal quarries	..	1	1	..	—
Public bathing places	..	2	2	..	—
Kraals for soaking coconut husks.	..	14	12	..	2
Butcher stalls	..	105	102	..	3
Fish stalls	..	50	46	..	4
Pork stalls	..	4	4	..	—
Fibre mills	..	14	10	..	4
Desiccating mills	..	7	6	..	1
Aerated water manufactories	..	11	9	..	2

29. *Milk Supply.*—Seventy-five samples of milk were examined by the Government Analyst at the request of the Sanitary Commissioner; of this number, 63 were found to be adulterated and only 12 samples were genuine milk: The adulteration usually consisted in the addition of water, and the percentage of added water varied from 4 per cent. to 82.9 per cent. Offenders within Local Board and Sanitary Board towns were prosecuted and punished and fines amounting to Rs. 530 recovered. Outside the areas of Local Board and Sanitary Board towns it is almost impossible to secure a conviction as the law requires proof that the water added was in itself noxious.

30. *Town Planning and Improvement.*—In addition to his routine duties the Sanitary Engineer of the Department carried out the following works for the Sanitary Board, Colombo District :—

Detail surveys were made and plans thereof (to a scale of 2 chains to an inch) were prepared of the following Sanitary Board areas for the purpose of town planning :—

- Part of Cotta, about 200 acres.
- Part of Nugegoda, about 100 acres.
- Part of Kirillapone, about 140 acres.
- Part of Karagampitiya, about 5 acres.

Road surveys and estimates were made for proposed roads at Karagampitiya in continuation of Allen avenue.

Type plans were designed for a public market comprising boutiques, meat stalls, vegetable stalls, and fish stalls; public laundry; pit latrine for estates; and school lavatory. Lithograph copies of these type plans have been prepared by the Surveyor-General's Department.

It is gratifying to note that applications for type plans of this branch are being received in increasing numbers from Chairmen of Urban District Councils, Local Boards, and Sanitary Boards.

31. *Sanitary Propaganda.*—There was a Public Health Section at the Gampaha Floral Festival which was held from July 7 to 14, 1923. The Public Health Section contained the exhibits of the Sanitary Department, the Bacteriological Institute, the Malariologist, and the Director, Anchylostomiasis Campaign. Each exhibit was in charge of members of the respective Departments, who were in attendance throughout the Festival in order to explain the exhibits to visitors.

The Sanitary Department exhibit consisted of models of the various type plans prepared by the Department, sanitary appliances, diagrams, posters, &c. A special exhibit was one displaying the life-cycle of the domestic fly from the egg to the full-grown insect as it occurs in nature; the rôle of the fly as a disease carrier and methods of trapping flies. The exhibit was illustrated by charts and descriptive posters.

The Bacteriological exhibit displayed the mode of spread of plague and the various methods of preventive inoculation.

The Malariologist's exhibit consisted of a collection of malaria carrying mosquitoes, illustrations of methods of malaria prevention; and maps and charts depicting the extent of the prevalence of malaria in Ceylon.

The Anchylostomiasis exhibit displayed the life-history of the hookworm, drugs used in treatment, and methods of prevention. A number of posters showing the ravages of the disease and the effects of treatment were on view.

Leaflets in English and the vernaculars in regard to the various preventible diseases in Ceylon were distributed among visitors.

The Public Health Section was housed in the central building of the Exhibition and the exhibits were well displayed. They attracted a large number of interested visitors.

32. July 9 was set apart as special sanitation day; in the morning lectures were delivered by the Sanitary Commissioner on "Public Health"; on "Town Surveys" by Mr. W. C. S. Ingles, Surveyor-General; and on "Town Planning" by Mr. C. H. Kilmister, Engineer of the Colombo Municipality. The afternoon was devoted to demonstration on town scavenging, town conservancy, and methods of disinfection.

These demonstrations were given by the Medical Officers of Health of this Department with the aid of actual appliances and materials used in carrying out these sanitary measures in practice.

In the evening popular lantern lectures were delivered by the Malariologist and by the Assistant Sanitary Commissioner. On the sanitation day a large number of visitors specially interested in the subject came to the Exhibition and attended the various lectures and demonstrations. Among the visitors were noticed Chairmen of District Councils, Local Boards, and Sanitary Boards, several Mudaliyars and Sanitary Inspectors, and Secretaries of various Local Boards.

33. During the period of the Festival a course of seven lectures in practical sanitation and demonstrations was given in Sinhalese by the Sanitary Superintendent to police headmen from various parts of the Island. The course was well attended and keen interest was taken in the subjects dealt with. In this connection appreciative mention must be made of the help given by the Colombo Press, which, without exception, afforded space in its columns for the daily insertion of an informative article by the Sanitary Commissioner on a matter of public health interest during the fortnight preceding the Gampaha Exhibition.

34. The Medical Officer of Health, Central Province, delivered two lantern lectures on sanitation at the Training Colony for teachers at Peradeniya.

Lantern lectures on sanitation were delivered by the Sanitary Superintendent in English at the Ananda School Cotta, and in Sinhalese at the Young Men's Buddhist Association Hall at Maradana, the Social Service League Hall, Maradana, and at Welikada Jail.

35. *Anchylostomiasis Campaign Areas: Mirigama Area.*—The work of sanitating the Mirigama area which was begun in 1922 was continued the following year. At the conclusion of the intensive campaign the small areas, each of which was in temporary charge of an Inspector, were combined into larger ones and each placed in charge of a permanent Inspector.

The police headmen of the Mirigama area who underwent a six months' course of training in sanitation and passed the examination held in December, 1922, were awarded their certificates on March 23, 1923, by the Government Agent, Western Province; the Sanitary Commissioner, the Assistant Government Agent, Western Province, and the Directors of the Anchylostomiasis Campaign being also present.

36. *Siyane Korale East Area.*—The next area selected for extension of the campaign against anchylostomiasis was Siyane korale east consisting of 100 villages containing 7,852 houses comprising 52 police headmen's divisions.

Eighteen Sanitary Inspectors were detailed for work in this area in January, 1923.

Owing to the extent of the area and lack of roads the training classes for police headmen had to be held at three centres, viz., Nittambuwa, Weke, and Pugoda. The course lasted the usual six months and was attended by 92 police headmen, vedaralas, vernacular school teachers, and others.

However, only 37 sat for the examination; and of this number, 27 passed and were awarded certificates in September, 1923. The presentation of certificates took place at the office of Mr. J. P. Obeyesekera, Mudaliyar of Siyane korale east, and was made by the Assistant Government Agent. There were also present Sanitary Commissioner, the Mudaliyar, and Drs. T. K. Jayaram and J. M. Hall.

37. *Hewagam Korale Area.*—In anticipation of the extension of the treatment campaign into Hewagam korale in 1924, a pre-sanitation campaign was started in this korale in September, 1923. This area consists of 115 villages containing 13,313 houses comprising 45 police headmen's divisions. A training class for these headmen was started in September and is still in progress. Eleven Sanitary Inspectors were appointed to this area and the work is well in hand.

38. *Central Province Campaign Area.*—The Director of the Anchylostomiasis Campaign in consultation with the Principal Civil Medical Officer proposed to start a combined village and estate area for treatment early in 1924. The area originally selected is bounded on the north by Mawanella-Kadugannawa road, east by Kadugannawa-Gampola-Nawalapitiya road, south by Nawalapitiya-Kellie estate road, and west by Kellie estate-Hatunugama-Mawanella road. The Sanitary Department was instructed to sanitize the villages in this area.

39. When an agricultural map of the proposed area was examined it was noticed that there were very few villages in it, and this Department suggested the inclusion of the triangular area between Kadugannawa, Peradeniya, and Gampola which consists mainly of villages. The suggestion was accepted and 7 Sanitary Inspectors were detailed for work in the area.

40. It should be mentioned that this area is not a suitable one for intensive sanitary work for the following reasons among others:—

The people are poor and very backward, the country is hilly and in some parts mountainous, the villages are scattered and very sparsely populated, the only means of access to the villagers' huts are paths usually across paddy fields. Another important point is the fact that the area lies in two different Provinces with different judicial and administrative centres accessible to majority of the Sanitary Inspectors by a long journey by cart or longer one by rail. In addition to the above the weather from the time work started till the end of the year was very wet. If permanent preventive measures against hookworm infestation is to prove a success the selection of areas for pre-sanitary work should be made with care, as otherwise the time, trouble, and money expended are wasted.

41. *Railway Sanitation.*—The staff consisted of a Medical Officer of Health and 7 Sanitary Inspectors, including the Inspector in charge of anti-malarial work. Dr. D. C. de Fonseka was in charge till end of August when Dr. W. T. de Silva succeeded him. In November, the northern section of the Railway comprising 37 stations was divided into two for more efficient working, and an additional Inspector was appointed with headquarters at Jaffna. Besides the regular latrine porters attached to railway stations there are six gangs of coolies containing 76 men attending to sanitary work at the more important railway centres. These men work under the direct supervision of the Inspectors.

42. The following is a summary of work done during the year :—

Inspections :

		Number		Number		Number
(1) Of Stations—		Inspected.		Defective.		Improved.
In connection with—						
Premises	..	2,232	..	293	..	280
Drains	..	2,695	..	418	..	354
Latrines	..	4,181	..	703	..	651
Mosquito-breeding spots	..	122	..	97	..	97
Water supply	..	1,373	..	110	..	92
Scavenging	..	1,304	..	279	..	231
Conservancy	..	2,068	..	130	..	94
(2) Of Bungalows—						
In connection with—						
Premises	..	5,473	..	939	..	896
Drains	..	5,455	..	964	..	843
Latrines	..	4,967	..	933	..	766
Mosquito-breeding spots	..	356	..	336	..	336
Water supply	..	3,286	..	65	..	24
Scavenging	..	3,810	..	550	..	507
Conservancy	..	3,715	..	275	..	256
(3) Of Lines—						
In connection with—						
Premises	..	2,677	..	666	..	516
Drains	..	2,595	..	571	..	496
Latrines	..	2,626	..	642	..	493
Mosquito-breeding spots	..	305	..	265	..	265
Water supply	..	1,496	..	133	..	37
Scavenging	..	1,659	..	460	..	417
Conservancy	..	1,891	..	170	..	157

43. *Infectious Diseases.*—The following infectious diseases were reported and all necessary action was taken in regard to them :—

Chickenpox ..	.. 11	Measles ..	.. 3
Dysentery ..	.. 3	Enteric fever ..	.. 1

44. *Reports on Major Sanitary Defects.*—During the year under review 672 reports were received at this office ; of these, the subject-matter of over 600 of the reports were attended to with satisfactory results. Out of the balance, some are pending attention at the hands of the Engineers and others are held back pending personal investigations by the Railway Medical Officer of Health.

45. Summary of work done by the Railway Sanitary Inspector engaged in anti-malarial work :—

- (1) 111 pits (potential and actual breeding spots of mosquitoes) were filled in, the capacity of which was, collectively, 119,301 cubic feet.
- (2) 64 gallons of kerosine oil and liquid fuel were used in oiling 12 pits, the surface of which was 8,432 square feet in extent.
- (3) 38 pits of 8,794 cubic feet capacity were dug to bury rubbish, &c., in.
- (4) 4,382,182 square feet of thick scrub and low jungle was cleared.
- (5) 588 trees (palmyra and other large varieties) and large bushes cut, rooted, and removed.
- (6) 22,052 cubic feet of new earth drains were provided to drain low-lying or marshy land.
- (7) 37,489 cubic feet of existing old earth drains were cleared, graded, and weeded.

46. *Sanitation in the Central Province.*—The sanitary staff in this Province consists of the Medical Officer of Health, with headquarters at Kandy, one Supervising Sanitary Inspector, and a clerk. There are 18 Inspectors in the Province, including the 7 officers engaged in sanitating the anchylostomiasis area.

The Medical Officer of Health of the Province has been appointed by Government an *ex-officio* member of the Urban District Council, Matale, constituted in January, 1923, and of the Local Boards and Sanitary Boards of the Province, in lieu of the local Medical Officers. This step will prove to be of great advantage, both to the bodies concerned and to the sanitation of the Province, as they now have the benefit of the expert advice and assistance of an officer whose duties are solely connected with public health and who has the resources of the Sanitary Branch at his disposal.

47. In view of the proposal to bring the whole Island under the operation of the Local Government Ordinance the question of bringing a number of growing bazaar areas under the Small Towns Sanitary Ordinance has been dropped. The carrying out of the former proposal has also been deferred, but it is hoped that a decision on the subject will be arrived at without much delay as in the meantime the sanitary condition of these bazaar areas remains unimproved.

48. *Water Supply.*—The water supply of the following towns continues to be inadequate, and no steps have been taken during the year to improve it :—Nawalapitiya, Dikoya, Wattegama, Kadugannawa, Kandapola, and Ragalla.

Steps have been taken to increase the pipe borne supply of water of the following towns :—Gampola, Hatton, and Matale.

Wells which form the source of water supply to the following small towns have been improved :—Palapatwella, Dambulla, and Kawudupelella.

The water supply of the following small towns which is derived from wells has been found to be unsatisfactory in quality on analysis :—Panwila (one well), Kandapola, Ragalla, Padiapelella, and Mailapitiya. The necessity for securing a better source of supply has been impressed on the local authorities.

49. *Scavenging and Disposal of Refuse.*—Scavenging in Kandy Sanitary Board towns continued to be done by the contractors, in the Nuwara Eliya Board towns through the superintendent of the estates in which the towns are situated, except Kotagala, Dambulla, and Pundaluoya, where the Board employs its own coolies.

The Matale Board employed its own coolies.

The scavenging work, except in a few instances, has been generally very satisfactory.

A good number of covered zinc bins for storing refuse has been provided in all towns.

50. *Disposal of Refuse.*—The refuse is disposed of either by tipping or by burning in an incinerator. During the year incinerators have been built at the following places :—Gampola, Galaha, Aluwihare, and Pussellawa.

Drying sheds attached to incinerators are useful in disposing of refuse in wet weather, and these have been recommended and provided in several places.

The building of the proposed incinerator at Maskeliya had to be deferred as it was found that the selected site was unsatisfactory. A new site has been selected and the work will be put through early in 1924.

The following statement shows the mode of disposal in the Local and Sanitary Boards in the Province :—

				Tipping.	Incinerators.
Local Boards	..	..	..	1	3
Kandy District	..	..	..	7	5
Nuwara Eliya District	..	..	..	1	11
Matale District	..	..	..	4	2

51. *Conservancy and Disposal of Excreta.*—New public latrines have been constructed at Panwila, Ulapane, and Aluwihare.

These towns had no public latrines before. In all the towns where there are public latrines, private dry-earth latrines are being installed. In some of the towns pit latrines are allowed in the case of the very poor. In the Urban District Council area of Matale, where there are a large number of pit latrines, a special effort has been made to substitute dry-earth latrines for the existing pit latrines. In 1923 twenty-nine new dry-earth latrines have been erected.

52. *Disposal of Nightsoil.*—The disposal in all towns is by trenching. During the year a trenching ground has been acquired for Teldeniya. Negotiations are proceeding for the acquisition of trenching ground for the following towns :—Ulapane, Panwila, and Kadugannawa.

In many of the Sanitary Board towns of the Province there are no proper trenching grounds, and the trenching is being done in tea or in waste land close to the latrines.

53. *Latrine Accommodation.*—During 1923 the new constructions in Local Board and Sanitary Board towns were—

Public latrines	..	..	..	Pail	24 seats
Private latrines	..	..	..	Pail	378 seats
Private latrines	..	..	..	Pit	80 seats

The provision of private latrines in the bazaar areas of the Sanitary Board towns of Nuwara Eliya District owned by estates has still to be enforced, this applies particularly to Maskeliya, Bogawantalawa, and Kotagala.

There are several Sanitary Board towns in Nuwara Eliya District in which many of the houses and boutiques are owned by estates ; these houses are not provided with latrines, and as a result faecal pollution is common. The estates owning these houses should be compelled, if necessary by law, to provide latrine accommodation for their tenants. The provision of latrines at public expense for such bazaars is not justifiable and would be unnecessary if the local authority takes necessary action to enforce the powers granted by law for safeguarding public health.

54. *Drainage.*—Extensions to existing built drains were carried out in the following towns :—Talawa-kele, Lindula, Holbrook, Nanu-oya, Galaha, Wattegama, Panwila, and Pussellawa.

New drains have been built in the following towns replacing unbuilt earth-drains :—Kandapola, Maskeliya, Matale, and Huluganga.

The drainage of the following towns is unsatisfactory :—Gampola and Bogawantalawa.

55. *Licensed Trades.*—The following is a list of licensed premises in the Province :—

Eating-houses	..	..	59	Galas	..	..	25
Tea and coffee boutiques	..	..	325	Aerated water manufactories	..	..	2
Bakeries	..	..	52	Maldiva fish stores	..	..	7
Fish stalls	..	..	33	Manure stores	..	..	2
Mutton stalls	..	..	15	Common lodging houses	..	..	1
Beef stalls	..	..	33				

Considerable improvement has been effected in trade premises, particularly bakeries and tea kiosks.

56. *Dairies.*—During the year an attempt has been made to improve dairies situated outside the Sanitary Board and Local Board limits.

The Kandy Sanitary Board was however of opinion that as the people of this district who deal in milk are generally poor and unable to carry out the requirements at once the enforcement of the amended Ordinance should be deferred. In the meantime an effort was to be made to improve the dairies and gradually bring them up to the requirements. Thus strict enforcement of the Ordinance has been postponed.

Improvements to dairies have been effected at Nawalapitiya and Galaha.

57. *Infectious Diseases.*—The following cases of infectious diseases were notified by the Inspectors of the Department :—

Chickenpox	..	..	84	Measles	..	..	38
Dysentery	..	..	1	Smallpox	..	..	38
Enteric fever	..	..	3				

Smallpox.—Thirty-seven of these cases occurred during the epidemic of the disease which prevailed towards the end of 1922 and lasted till May, 1923.

The total number of cases in this epidemic was 198 with 31 deaths. The disease started in Kandy town, where it remained unrecognized for some time.

As a result many of the towns and villages around were infected.

Cases occurred in the following places :—

	Cases.	Distance from Kandy. Miles.		Cases.	Distance from Kandy. Miles.
Kandy	.. 70	.. —	Udangomuwa	.. 3	.. 10
Wattegama	.. 27	.. 9	Galaha	.. 10	.. 17
Matale	.. 10	.. 16	Dehiange	.. 25	.. 9
Galagedara	.. 5	.. 10.8	Gampola	.. 1	.. 12
Peradeniya	.. 25	.. 4	Mulgama	.. 15	.. 21
Udumulla	.. 3	.. 10	Old Medagama estate	.. 4	.. 21

58. In addition to the permanent Inspectors stationed in the affected area 12 officers and 4 disinfecting orderlies were appointed for duty and worked under the supervision of the Medical Officer of Health, Central Province, and the Supervising Sanitary Inspector. The Assistant Sanitary Commissioner paid several visits to the infected area.

Cases occurring in the immediate vicinity of Kandy were admitted to the Infectious Diseases Hospital at Kandy and contacts were kept in the Kandy Camp, Temporary Infectious Disease Hospital and camps were appointed by the Principal Civil Medical Officer.

One case of smallpox occurred on Mousaela estate, Lindula, in September, 1923, the source of infection could not be traced.

59. *Building and Housing Ordinance.*—The work done under this head is as follows :—

Number of building applications referred for report	..	..	171
Number of building applications recommended	..	..	143
Number of new buildings constructed	..	..	122
Number of buildings reconstructed	..	..	16
Number condemned as unfit for human habitation	..	..	41
Number of closing orders obtained	..	..	4
Number of buildings demolished as unfit for human habitation	..	..	34
Number of buildings improved by providing windows, cementing, &c.	..	..	392
Number of new windows put in	..	..	283

In July, 1923, the Kandy Sanitary Board resolved to inform the Medical Officer of Health and Sanitary Inspectors that they are not to issue notices ordering alterations to buildings or order such alteration themselves but are to send them to the Kachcheri where they will be signed or modified by the Chairman or Deputy Chairman.

This resolution was passed, and it was the opinion of the Board that the poorer Sanitary Board towns must pass through an educational period of several years before a strict enforcement of all the regulations, especially the building regulations, will be practicable and just.

60. It might be mentioned here that in getting improvements effected every endeavour has always been made by the Medical Officer of Health to see that no undue hardship was caused, and that improvements were suggested only to those who were well able to afford to carry them out and where the improvements were indicated in the interest of the community as well as the individual. It should also be stated that owners have in many instances carried out improvements as a result of the Medical Officer of Health being able to convince them of the necessity thereof in their own interest.

61. *Rural Sanitation.*—The Inspectors stationed in various Sanitary Board towns attended to the rural areas around their stations.

The work done has been—

- (1) Installation of latrines ;
- (2) Attention to general cleanliness of premises ;
- (3) Attention to cases of infectious disease.

As has been pointed out before, the authority to work in rural areas is limited and nothing has been done to improve matters. Here, again, the likelihood of the areas coming under the operation of the Local Government Ordinance prevents anything definite being done.

62. Abatements of nuisances have been effected under the Nuisance Ordinance through notices signed by the Police Magistrate, and the regulations for the construction of latrines have also been enforced. In the notices served for the abatement of nuisances, suggestions for improvements have frequently been made, and thereby a great deal of work has been done in these rural areas, although there are no by-laws or a Board of Health for the Province whereby these suggestions could be enforced.

63. *Miscellaneous.*—During the year under review the following special inspections and reports were made by the Sanitary Commissioner :—

- (1) Report on the sanitation of the area under the Urban District Council of Jaffna made at the request of the President of the Local Government Board.
- (2) Report on the railway station site at Trincomalee and recommendations as to a public health policy for Trincomalee.
- (3) A combined report by the Sanitary Commissioner and Malariologist on the preventive measures necessary in order to establish a healthy settlement at Talaimannar.
- (4) Report with recommendation on the existing method of scavenging at the Customs, Colombo, made at the request of the Chairman, Colombo Port Commission.
- (5) Reports by the Sanitary Commissioner and Assistant Sanitary Commissioner on conditions existing at Mandapam Camp made at the request of the Chairman, Board of Immigration and Quarantine.

64. *General Remarks.*—It is my duty to once again point out that the Sanitary Department and its officers have no legal status in the Colony. It is also my duty to reiterate in this report the urgent need for placing in the statute book at the earliest possible moment a Public Health Ordinance.

In reviewing the past year it may be stated with confidence that general interest in the public health is increasing. In some cases it would appear that a healthy public opinion is developing to such an extent that backward local authorities may find themselves in the position of being urged by their citizens to take action instead of filling the more worthy rôle of leading the van of sanitary advance.

SECTION IV.—METEOROLOGY.

29. *Rainfall.*—The year 1923 was one of exceptionally heavy rainfall. This was most noticeable during the south-west monsoon at the stations on the west and south-west sides of the Island. Carney estate (between Ratnapura and Adam's Peak) had again the distinction of the highest rainfall for the year, viz., 319·3 inches on 280 days, or 93·1 inches and 47 days above its own average. A group of stations in the Ambegamuwa district were not far behind, and include Blackwater 313·6 and Kenilworth 295·3 inches, while Watawala 288·1, Ingoya 282·9, and Kellie (Dolosbage) 271·8 inches are all noteworthy.

The exceptional activity of the south-west monsoon on the windward side was associated with exceptionally complete shielding so far as rain was concerned on the lee side, but nevertheless the rainfall totals for the year were in most cases above average on that side too, thanks to heavy rain in January and December St. Martin's estate (Rangalla) had the highest total on the eastern side, namely, 209·4 inches or 27·0 inches above its own average.

At the other extreme Marichchukkaddi still holds the record for the lowest annual average, namely, 34 inches. Its total this year was 46·3 inches, which is slightly above the totals at two other stations immediately south of it, namely, the Puttalam Eastern Saltern and Ponparippu Resthouse, where the 1923 totals were 45·9 and 39·5 inches respectively.

Colombo (Observatory), Kandy, and Nuwara Eliya recorded 95·4, 116·5, and 127·9 inches respectively, which give excesses of 14·9, 32·7, and 34·8 inches above their respective averages. The longest drought occurred at Paranthan railway station, lasting for 191 days, March 15 to September 21. The longest wet period occurred at Labugama, lasting for 133 days, May 26 to October 5.

30. *Temperature.*—The station showing the highest mean shade temperature for the year was Trincomalee with 82·8° F., and the lowest Nuwara Eliya with 59·8° F. The figures for Colombo and Kandy were 80·5° F. and 76·5° F. respectively.

The highest shade temperature in air recorded during the year was 99·9° F. at Trincomalee on May 8. The highest on record is 103·7° F. at Trincomalee on May 12, 1890. The lowest this year was 32·9° F. at Nuwara Eliya (6,000 feet above sea level) on February 17, at which station 27·1° was recorded in 1914.

The highest shade temperature at Colombo in 1923 was 92·5° F. on March 24, and the lowest 65·5° on February 7.

The mean daily range, *i.e.*, the difference between the mean of the maximum and the mean of the minimum, was highest at Badulla 17·7° F., and lowest at Galle 8·2° F. At Colombo and Kandy it was 12·2° F. and 15·0° F. respectively. The absolute range for the year, *i.e.*, the difference between the highest and the lowest readings actually recorded at any one station, was greatest at Nuwara Eliya (45·7° F.), and lowest at Galle (20·2° F.).

SECTION V.—HOSPITALS, ASYLUMS, AND DISPENSARIES.

31. In 1923 there were 83 Government general hospitals, providing about 7,165 beds with varying accommodation from 16 beds in smaller outstations to 800 beds in the General Hospital, Colombo.

There were in addition a number of special hospitals, *viz.*, a lying-in home with 100 beds, an eye hospital with 60 beds, a women's hospital of 34 beds, a children's hospital of 50 beds, a female venereal hospital of 30 beds, a police hospital of 34 beds, a tuberculosis hospital for chronic cases of 286 beds, a tuberculosis sanatorium of 72 beds, an infectious diseases hospital of 100 beds, a lunatic asylum with 1,200 beds, and a leper asylum with 450 beds in or near Colombo; a temporary lunatic asylum with 150 beds at Matara, Southern Province; and a leper asylum with 150 beds at Mantivu, Eastern Province.

Seventy-eight estate hospitals and 565 estate dispensaries were maintained by proprietors of estates.

There were 513 Government dispensaries in different parts of the Island in 1923, and 2,742,868 patients who paid 3,961,183 visits were treated at these dispensaries and the out-patient departments of hospitals during the year. The total number of in-patients who were treated at the various hospitals was 188,113, with a mortality rate of 6·87 per cent.

The following buildings were completed during the year:—New War Memorial Ward, Galle Hospital, in the Southern Province, and Ratmalai dispensary in the North-Central Province.

32. The following is a summary of the chief features of the report of the Medical Superintendent, General Hospital, Colombo:—

660 patients remained in hospital on December 31, 1922, 36 in the paying section and 630 in the non-paying section.

During the year 16,946 patients were admitted, 15,932 to the non-paying wards and 1,014 to the paying wards. At the Out-patient Department 32,454 persons were treated, representing 78,424 attendances, *i.e.*, a daily average attendance of 214.

Of the 1,050 under treatment in the paying section, 929 were discharged, 74 died, and 47 remained on December 31, 1923.

Of the 16,562 under treatment in the non-paying section, 13,842 were discharged, 2,000 died, and 720 remained on December 31, 1923.

The daily average sick in hospital was 55·05 in the paying section and 713·55 in the non-paying section.

The maximum and minimum numbers of patients in hospital on any one day during the year in the paying and non-paying sections respectively was as under:—

Paying Section.			
Maximum	..	..	71 on December 21, 1923
Minimum	..	..	40 on January 2 and 7, 1923
Non-paying Section.			
Maximum	..	..	839 on September 18, 1923
Minimum	..	..	595 on January 9, 1923

Of the 15,932 admitted in 1923 to the non-paying section, 6,816 were surgical cases and 9,116 were medical cases.

The number of surgical operations performed in 1923 was 2,963, exclusive of 285 minor operations performed in the Out-patient Department. 2,607 operations were performed in non-paying section with 191 deaths, giving a percentage mortality of 7·3.

In the paying section the number of operations was 356 with 4 deaths, giving a percentage mortality of 1·1.

The following table gives the figures for the past two years of the cases under treatment, the percentage mortality, and the daily average number in hospital in the paying and non-paying sections, respectively:—

	Paying Section.		Non-Paying Section.	
	1922.	1923.	1922.	1923.
Cases under treatment	997	1,050	16,331	16,562
Deaths	59	74	1,847	2,000
Percentage mortality	5·9	7·4	11·30	12·07
Daily average sick	49·6	55·05	764	713·55

The wards in the non-paying section of the hospital continue to be overcrowded, due largely to the number of chronic incurable cases which cannot be discharged owing to the fact that they have no home to go to. A few cases of tuberculosis have been transferred to Ragama and about 30 incurable patients to the Victoria Home for Incurables. An effort is being made to make use of the Municipal enteric fever ward, but there are difficulties in the way, and the physicians are loth to take the responsibility of recommending a transfer, except in the very early stages of the disease.

As regards particular diseases the following figures are appended showing their prevalence and mortality during the last three years :—

	1921.		1922.		1923.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Anchylostomiasis	812	135	585	81	553	134
Malaria	1,135	20	2,121	37	2,250	15
Appendicitis	203	3	167	5	169	—
Parangi	274	1	306	4	426	—
Dysentery	395	78	262	69	194	88
Pneumonia	470	235	685	364	381	189
Enteric fever	316	102	297	95	248	104
Pulmonary tuberculosis	765	346	527	232	517	257

Malarial fever and parangi show an increase, enteric fever, dysentery, and pneumonia a decrease, while phthisis has remained more or less stationary.

X-Ray Department.—Eighty-eight private and 462 hospital patients attended this department. The fees accruing to Government for the private patients amounted to Rs. 1,445. Dr. Ellison took charge of this department on December 1, 1923.

New Memorial Ward.—The new Seamen's or Memorial Ward was opened on October 16, 1923, and the number of admissions to the end of the year was 35. This ward supplies a long-felt want, i.e., a well-equipped up-to date ward for the accommodation of seamen passing through this important port. It has made available more accommodation in the old Seamen's Ward for residents.

Venereal Clinic, General Hospital.—The following is an abstract of the report submitted by Dr. E. C. Alles :—

The clinic is conducted on Mondays and Thursdays at 1.45 p.m., and it is fairly well attended, especially so on Mondays. The clinic is very popular and it fulfils a great need to the poor public. It is open only to men. All cases of syphilis, soft cancers, yaws, gonorrhœa, and non-venereal skin diseases are treated as out-patients, only deserving cases being admitted into the wards. This relieves the congestion in the Lower Ulcer Ward to a large extent. Those who are admitted into the wards comprise the very destitute people with no homes, or those who have come to Colombo from a great distance, often by begging their way along, and those with complications which require more energetic treatment, operative or non-operative, such as more frequent dressings; minor operations are done at the clinic under local anæsthesia. Careful records of cases are kept, and diagnosis made, when necessary, by microscopical work or serum tests.

The number of cases treated for the year ending 1923 is as follows :—

	Cases.		Cases.
Syphilis	480	Yaws	61
Softsores	126	Non-venereal diseases	30
Gonorrhœa	336		

The patients are told verbally to continue treatment for two years and finish the course prescribed ; they are also given printed leaflets, which explain the diseases and the importance of thorough treatment, but in spite of all this very few indeed attend regularly and complete the course of treatment. Both cases of syphilis and gonorrhœa stop taking treatment as soon as their major symptoms disappear, and they only come back when there is a recrudescence, and the treatment has to be started all over again.

Effects of Treatment: There has been no cases of death following injections of salvarsan or any of its modifications. There have been a few cases, about half a dozen, of swelling and œdema after injections, but none ended in cellulitis or sloughing. There were two cases of arsenical dermatitis, these were admitted into the ward and recovered.

Out-patient Department.—The staff of this department was increased by the appointment of an additional House Officer who assumed duties on October 1, 1923, and 2 Religious Nursing Sisters. Strict supervision has been exercised over this department, and I am glad to be able to report that no complaints of any consequence were received. While on the other hand one has had testimony of prompt and efficient treatment at the hands of the officers concerned.

Staff.—It is with deep regret that the death is recorded of Dr. W. E. Canekaratna, Visiting Physician. Out-patient Department, who died of pneumonia after a very short illness. Dr. Canekaratna was an officer of great promise, and his untimely death is to be deplored. He has been succeeded by Dr. Wijeratna. The following additional appointments to the staff were made during the year :—Dr. W. W. E. Karunaratna, Clinical Pathologist ; and Dr. Lionel de Silva, 5th Physician. Dr. Grenier, Senior Physician, was on leave from the end of May.

Expenditure and Receipts.—The receipts during the last financial year from patients in the paying section amounted to Rs. 113,639.82 and in the non-paying section Rs. 3,720. The approximate expenditure during the same period was Rs. 50,826.93 in the paying section and Rs. 147,198.03 in the non-paying section. The expenditure in both sections does not include the salaries of the medical and nursing staff nor the cost of drugs and dressings.

33. *The Lunatic Asylum.*—There were 635 males and 462 females in the asylum at the beginning of the year, 309 males and 150 females were admitted during the year, and the total number treated in 1923 was 944 males and 612 females, as against 868 males and 575 females treated in 1922.

156 males and 69 females were discharged, and 67 males and 60 females died during the year.

The percentage of deaths to total treated was 8.16 in 1923, 6.23 in 1922. The principal causes of death were tuberculosis 51, dysentery 23, diarrhœa and enteritis 13, and general debility and senile decay 12.

The daily average number resident for asylum cases was 668.1 males and 475.03 females, as compared with 602.58 males and 443.42 females in 1922.

In the House of Observation 46 males and 19 females remained at the end of the previous year. and 362 males and 148 females were dealt with during the year, as against 319 males and 168 females in 1922. Of these, 182 males and 89 females were committed to the asylum, 143 males and 42 females were discharged, and 18 males and 8 females died.

The numbers remaining on December 31, 1923, were 19 males and 9 females. The daily average for both institutions together was 714·89 males and 498·1 females, as against 639·11 and 464·31 respectively in 1922. The largest number simultaneously resident was 1,255 and the lowest 1,096, as compared with 1,231 and 1,077 the previous year.

The usual occupations were provided for the patients, chiefly gardening and outdoor work for the men and sewing and making of coir rope for the women.

Overcrowding is still a marked feature of this institution, and so is the lack of suitable accommodation for better class patients. The erection of the new asylum at Angoda, a few miles outside Colombo, makes but slow progress owing to the limited vote for expenditure on it each year. (The sum required for completion has been voted during 1924, and it is hoped to complete the building by the end of financial year 1924–25.)

34. *De Soysa Lying-in Home (100 Beds).*—The number of cases under treatment during the year was 2,934, as against 3,002 in 1922, 3,506 in 1921, and 2,556 in 1920. The death-rate was 2·4 per cent., as against 2·5 in 1922, 2·29 in 1921, and 3·01 in 1920. Of the 71 deaths, 20 were due to the accidents of childbirth and puerperal causes, the other deaths being due to intercurrent diseases, such as anchylostomiasis, influenza, pneumonia, dysentery, &c.

The number of births was 2,312. Of these children, 1,874 left the hospital, 299 were stillborn, and 139 died soon after delivery—28 pairs of twins and 1 set of triplets were born during the year.

220 operations were performed in 1923, including the use of forceps in 66 cases, craniotomy in 32 cases, embryotomy in 4 cases, and decapitation in 2 cases. Labour was classified as normal in 2,423 cases (occipito anterior 2,141, occipito posterior 282). There were 8 face, 2 brow, 38 pelvic, and 11 transverse presentations.

In 29 cases of placenta previa, 9 children were born alive, 19 were born dead, and 1 was undelivered; 28 mothers recovered, 1 died. Of 58 cases of puerperal eclampsia and 40 cases of contracted pelvis treated during the year, 54 of the former and 39 of the latter recovered and were discharged.

35. *The Victoria Memorial Eye Hospital and the Grenier Ear, Nose, and Throat Infirmary.*—19,253 patients paid 53,067 visits to the Out-patient Department during the year, as against 18,931 and 50,262 respectively in 1922. Of the out-patients treated, 15,653 were eye cases, 2,598 ear cases, 324 nose cases, and 678 throat cases. The number of new admissions as in-patients was 1,313, as against 1,460 in 1922; and the daily average sick in hospital was 75·24 in 1923, 78·77 in 1922. The total number of operations performed on in-patients during the year was 603, on out-patients 1,457.

There is an eye department attached to the General Hospital at Galle and to the General Hospital at Kandy. At Galle 436 cases were treated as in-patients and 729 as out-patients, at Kandy 540 cases were treated as in-patients and 805 as out-patients.

36. *The Lady Havelock Hospital for Women (40 Beds) and the Lady Ridgeway Hospital for Children (50 Beds).*—The total number of admissions in 1923 was 2,481 and with those remaining from the previous year the total treated during the year was 2,569, which is 154 more than in 1922.

The daily average sick was 93·53, as against 92·96 in 1922, and there was constant overcrowding both in the Lady Havelock Hospital and Lady Ridgeway Hospital.

The number of paying patients admitted during the year was 74, an increase of 8 on the previous year. Of these, 15 were maternity cases.

The total number of deaths during the year was 557, a mortality-rate of 21·6 per cent. This very high death-rate was due to the very large number of babies admitted in a more or less moribund condition and the admission of a greater number of starvation cases in 1923.

Several cases of congenital syphilis and parangi were admitted into the children's wards, and treated with weekly injections of N. A. B. All patients were treated for anchylostomiasis and round-worms with oil of chenapodium and carbon tetrachloride as a routine. A large number of cases of puerperal septicæmia were admitted during the year, several had retention of portions of placenta and were in a very lacerated condition, showing that the practices adopted by the village midwives who attended them were not according to modern teaching.

The number of surgical operations performed during the year was 727; and of these, 537 were major operations including 60 abdominal sections. The operation mortality-rate was 5·9 per cent. These were chiefly acute conditions admitted in a moribund condition.

Twenty-nine pupil nurses were admitted for training during the year. Only one examination was held in 1923 as the nurses training was extended from two to three years under the new scheme.

The total nursing staff consists of 1 European matron, 2 European sisters, 10 Ceylonese charge nurses, and 25 pupils.

37. *The Police Hospital, Borella.*—The number of patients treated during the year was 1,211, as against 1,153 in 1922; of these, 390 were for malaria, chiefly relapses in police who had been transferred to Colombo from various malarious stations, and 211 for influenza. There were only 4 deaths in 1923; from enteric fever 1, lobar pneumonia 2, and fracture of skull 1. The death-rate for the year was ·33 per cent. 3,880 patients were treated at the out-patient department of this hospital and at the eight branch police dispensaries in the town, as against 4,374 in 1922.

A Police Surgeon and an Assistant Police Surgeon are attached to the Police Force in Colombo and its suburbs, and they have the medical care of about 1,500 police of all ranks and their families.

38. *The Infectious Diseases Hospital, Colombo.*—Three permanent wards and several large temporary cadjan sheds in extensive grounds are available at this institution for cases of infectious disease from Colombo and its neighbouring villages and from infected ships arriving at the port.

The number of cases treated during the year was 1,297 with 98 deaths and a mortality-rate of 7·55 per cent., as against 804 cases treated, 58 deaths, and a death-rate of 7·21 per cent. in 1922.

The number of cases of smallpox admitted during the year was 32; 8 imported cases and 24 local cases. Of the former, 2 were confluent, 4 discrete, and 2 modified. Of the latter, 9 were confluent, 8 discrete, and 7 modified. Of the local cases, 14 had no visible marks of vaccination and 8 were unvaccinated. There was only 1 death from smallpox of an unvaccinated child with a confluent attack.

Twenty-nine primary and 1,021 revaccinations were performed at the hospital during the year, and 744 of these were successful. 97 cases of plague were admitted and with 5 cases remained at the end of the previous year a total number of 102 cases were treated during the year. Of these, 79 died, 16 were discharged, and 7 remained on December 31, 1923, as against 54 cases treated, 6 discharged, 43 died, and 5 remained in the previous year.

Of the 97 cases admitted, 84 were males and 13 females; 6 were septicæmic and 91 bubonic. All the septicæmic cases proved fatal. Of the bubonic cases which died, 39 had groin buboes, 26 axillary, and 8 cervical. Of those who recovered, 12 had groin buboes, 3 axillary, and 1 cervical.

Of the other infectious diseases treated during the year, 735 were cases of chickenpox, 155 of measles, 11 of whooping cough, 8 of diphtheria, 92 of mumps, and 13 of enteric fever from rural areas outside the Municipality of Colombo. There is a separate Municipal Enteric Hospital for urban cases.

39. *The Convict Hospitals.*—In 1923 there were 10 hospitals for prisoners; at Borella (Colombo) 213 beds, Welikada (Colombo) 8 beds, Mahara 49 beds, Negombo 17 beds, Bogambra (Kandy) 32 beds, Jaffna 12 beds, Galle 12 beds, Batticaloa 5 beds, Anuradhapura 52 beds, and Badulla 7 beds.

A total number of 9,724 sick prisoners were treated at these hospitals during the year with 83 deaths and a mortality-rate of .85 per cent.

11,367 prisoners paid 18,864 visits to the jail dispensaries to be treated for minor ailments.

Eleven prisons were maintained during the year—at Welikada, Hulftsdorp, Mahara, Negombo, Kandy, Bogambra, Jaffna, Galle, Batticaloa, Anuradhapura, and Badulla—and the number of prisoners in these prisons on December 31, 1922, was 3,168 (3,093 males and 75 females).

15,120 male prisoners and 451 female prisoners were admitted, 15,022 males and 426 females were discharged, and 83 males only died during the year under review. The death-rate for the year was .4 per cent.

The general health of the prisoners was satisfactory during the year.

At the Borella Convict Hospital 3,281 cases were treated during the year with 47 deaths and a mortality-rate of 1.43 per cent., as against 3,158 treated, 41 deaths, and a death-rate of 1.29 per cent. in 1922. The daily average sick for the year was 93.58, as against 113.26 the previous year.

At the Mahara Jail Hospital 4,002 cases were treated during the year with only 9 deaths and a percentage of deaths to total treated of .22.

The daily strength of the jail was 671.78, daily average sick 68.57, and the percentage of deaths to strength of jail 1.35, as against 796.86, 94.84, and 4.39 respectively in 1922.

Malaria is endemic at Mahara, and the total number of cases of malaria treated in hospital during the year was 2,033 with 2 deaths, as against 3,377 cases with 20 deaths in 1922, and 1,711 cases with 27 deaths in 1921. The fall in the death-rate was due to active preventive measures which commenced in the latter half of 1922 being continued in 1923. All the prisoners were given quinine every other day as a prophylactic for long periods during the year. Of the 2,033 cases of malaria admitted to the hospital, 326 were primary infections and 1,707 subsequent attacks (relapses).

40. *Medical Institutions aided by Government.*—The following institutions were aided by Government during the year:—

(1) The Victoria Home for Incurables; (2) Wiseman Hospital, Welimada; (3) McLeod Hospital Inuvil; (4) Jevon's Dispensary, Puttur; (5) Jevon's Dispensary, Batticaloa; and (6) the Wesleyan Medical Mission Dispensary at Kattankudy. No. (1) for males and females, Nos. (2) to (6) for women and children only.

Victoria Home for Incurables.—73 patients remained on December 31, 1922, and 46 were admitted during 1923, making a total of 119 under treatment. Of these, 20 died, 10 were discharged, and 89 remained at the end of the year.

Wiseman Hospital, Welimada.—322 in-patients were treated during the year, including 36 maternity cases. Of these, 18 died, 297 were discharged, and 7 remained on December 31, 1923. The number of cases treated at the dispensary during the year was 2,889. The diseases treated were mostly malarial fever, dysentery, diarrhoea, anchylostomiasis, pneumonia, burns and scalds, and ulcers. The hospital is availed of by patients from villages as far distant as Attampettia, Hakgala, Ambawella, and Parangama, and supplies an undoubted want.

McLeod Hospital, Inuvil.—The hospital reached its twenty-fifth anniversary in September, 1923. The total number of cases treated during the year was 1,921 with 74 deaths and a mortality-rate of 3.85 per cent., as against 1,868 cases with 96 deaths and a death-rate of 5.13 per cent. the previous year.

The number of maternity cases treated was 571; 505 cases in hospital and 66 cases in the villages.

3,871 out-patients paid 5,356 visits in 1923. Of the 505 maternity cases in hospital, 316 were normal and 85 premature labours. Ten pairs of twins and 1 set of triplets were born during the year.

The Jevon's Dispensary, Puttur.—687 patients were seen 1,832 times at the dispensary and in the villages. Ninety visits were paid to the villages to treat ordinary and labour cases. Many patients were persuaded to go as in-patients to the Inuvil hospital. Much preventive and infant aid maternal welfare work was done in the secluded homes of the neighbouring hamlets.

The Jevon's Dispensary, Batticaloa.—1,597 visits were paid by out-patients in 1923, as against 1,874 the previous year. Thirty-seven maternity cases were treated in the town. In the small ward of 3 beds attached to this dispensary 39 patients were treated with 1 death during the year.

The lady in charge visits the homes of the poor and gives advice to expectant mothers.

The Wesleyan Medical Mission Dispensary at Kattankudy.—Moor women and children treated at this dispensary in the midst of a thickly populated Moorish village, and large numbers attend for advice and treatment.

SECTION VI.—MISCELLANEOUS.

41. *Report on the Working of the King Edward VII. (Memorial) Anti-Tuberculosis Fund for the Year 1923, together with Brief Résumé of past activities of the Sub-Committee of the Fund.*—The King Edward VII. (Memorial) Anti-Tuberculosis Fund was started in December, 1910, on the recommendation of the Committee appointed at the public meeting held in Colombo on October 14, 1910, presided over by His Excellency Sir Henry McCallum, G.C.M.G., to consider the best form the proposed memorial to His Majesty King Edward VII. should take.

Letters and posters (in English, Sinhalese, and Tamil) stating the objects of the Fund were circularized throughout the whole Colony, and 3,557 subscription lists and 585 collection boxes were issued.

Collections ceased on December 18, 1911, when the Fund amounted to Rs. 361,800·93, inclusive of the donation of Rs. 150,000 by the late Mr. J. N. and Mrs. Campbell, but exclusive of the later donation of Rs. 60,000 from the late Mr. A. E. de Silva towards the construction of the sanatorium at Kandana.

In 1911, a number of leaflets, &c., were issued by the Sub-Committee of the Fund on the subject of the measures to be taken for the prevention and cure of tuberculosis.

In August, 1912, it was decided that, in commencing the campaign against tuberculosis in Ceylon, the following three institutions should be built :—

- An institute or central dispensary in Colombo ;
- A sanatorium ; and
- A hospital for chronic cases.

The negotiations connected with the site for the institute occupied a considerable time, and in October, 1913, it was decided to build the institute on its present site at the corner of San Sebastian hill and Saunder's place. The foundation stone was laid by His Excellency Sir Robert Chalmers, G.C.B. (now Lord Chalmers), on June 2, 1914, and the institute was completed in February, 1916, for a sum of Rs. 88,342·85, which included the cost of electric lighting, X-Ray plant, &c. The institute was opened in October, 1916.

It was decided, instead of erecting a new building, to make use of the existing buildings at the Ragama new camp for the hospital for chronic cases, and the necessary alterations were commenced in July, 1916. Although these alterations were not completed till the beginning of 1918, patients have been accommodated since January, 1917. The alterations and improvements cost Rs. 26,845·02.

The site at Kandana was given by the late Mr. A. E. de Silva, in addition to a sum of Rs. 60,000 for the building. The construction of the sanatorium was commenced in January, 1917, and it was opened in January, 1919. The cost of the sanatorium was Rs. 87,220·86.

The following sums were expended on the equipment of the three institutions :—

				Rs.	c.
Institute at Saunder's place	..	..	..	6,328	43
Hospital at Ragama	..	..	..	8,471	8
Sanatorium at Kandana	..	..	..	8,321	92
Total ..				23,121	43

The maintenance of the institute and the hospital was handed over to the Director of Public Works in October, 1916, and that of the sanatorium in January, 1919. Since then several additions have been made to the Ragama hospital and Kandana sanatorium out of the moneys of the Fund. The present accommodation of these two institutions is as follows :—

- Ragama hospital (about 286 beds) all for non-paying patients.
- Kandana sanatorium (72 beds) all for non-paying patients.

The following works are now being carried out by the Public Works Department :—

- Ragama Hospital.*—(a) Construction of two additional wards to accommodate 40 beds at an estimated cost of Rs. 31,000.
- (b) Extension of nurses' quarters to provide for two more nurses, who will be required when these two additional wards are opened. The estimated cost of the work is Rs. 5,500.
- Kandana Sanatorium.*—(a) Fencing of the wards at Kandana sanatorium at an estimated cost of Rs. 2,130.
- (b) A combined scheme of water supply and electric lighting at an estimated cost of Rs. 22,500.
- (c) Construction of a dhoby house, tank, and 5 rooms (coolie lines) at an estimated cost of Rs. 7,153.
- Colombo Institute.*—(a) Fixing of glazed tiles on the outside verandahs at an estimated cost of Rs. 2,650.
- (b) A sum of Rs. 1,500 has also been earmarked for the purchase of a Finsen light or mercury vapour lamp apparatus for the treatment of tubercular adenitis, conjunctivitis, &c., at the institute.

It has also been decided to erect a sanatorium in the Northern Province at a cost of not more than Rs. 100,000 (including the cost of acquisition of land). The Government Agent, Northern Province, has been asked to select, in consultation with the Provincial Engineer, a site for the purpose, and the Director of Public Works has been asked to furnish an estimate and a plan for the proposed sanatorium.

A number of posters in English, Sinhalese, and Tamil regarding the prevention and cure of tuberculosis were broadcasted throughout the Island last year, and it has been decided to issue these posters at intervals of at least once a year. A series of health letters relating to the incidence, spread, and prevention of tuberculosis will shortly be published in the newspapers.

By the retirement last year of Sir J. G. Fraser, Kt., C.M.G., who had been the Chairman of the Sub-Committee of the Fund since its inception, and the death early this year of Sir P. Arunachalam, Kt., the Sub-Committee has been deprived of the very valuable services of two gentlemen who have always taken the greatest interest in the campaign against tuberculosis in Ceylon.

42. *The Ceylon Medical College.*—The following table gives particulars *re* the number of students of the College :—

Number of Medical Students on December 31, 1922	..	215
Number of Apothecary Students on December 31, 1922	..	46
Number of Medical Students who joined the College in 1923	..	—
Number of Apothecary Students who joined the College in 1923	..	—
Number of Medical Students who passed out in 1923	..	11
Number of Apothecary Students who passed out in 1923	..	12
Number of Medical Students who left the College in 1923	..	8
Number of Apothecary Students who left the College in 1923	..	1

During the year the medical students received their training in Chemistry, Physics, and Biology at the University College. In consequence of changes made in the curriculum for the education of medical students by the Medical Council in England, no medical student can be registered as such until, apart from a preliminary examination in general knowledge, he has also passed a preregistration examination in Physics and Chemistry. Arrangements have been made with the University College authorities to conduct such preregistration examination. After passing such examination and becoming registered as a medical student the course of study now extends over five years. Students are admitted to the College on the results of the pre-registration examination held by the University College in order of merit according to the number of vacancies in the Medical College. The new rules have been published in the *Government Gazette* of August 3, 1923. Apothecary students will, in future, be required to sign a bond that, if required, they will agree to serve for three years as estate dispensers after passing the necessary examinations.

The revenue of the College for the financial year October 1, 1922, to September 30, 1923, was Rs. 31,188, and the expenditure for the same period was Rs. 55,763·01. The fees have been increased to Rs. 500 per year.

The rebuilding of the College is an urgent necessity, some classes being twice as large as the accommodation provides for.

43. *Civil Medical Stores.*—During the year there was no difficulty experienced in obtaining supplies of drugs, &c. The want of further accommodation is being keenly felt, as several new dispensaries, civil and estate, have been opened up during last year, necessitating larger supplies being indented for. With the gradual expansion of the Department, there is at present a much greater demand for printed forms and stationery, which could not be met owing to lack of funds, the votes being inadequate.

520 estate dispensaries were supplied with drugs during the year.

42,238 bulbs of salvarsan, &c., were used during the year in the treatment of parangi.

Drugs and instruments, &c., were purchased at a cost of Rs. 575,785. A sum of Rs. 9,890 was realized by sale of drugs to estates. Free drugs to Government Departments other than the Medical Department were issued to the value of Rs. 15,675. Issues of quinine to the amount of 189,046 oz. of the value of Rs. 276,120 were made. Opium and its preparations to the value of Rs. 208,280 were received and the amount realized from the sale of opium and its preparations was Rs. 5,198, there being a marked fall in prices, as against last year when the prices were nearly double.

44. *Opium.*—The number of depôts in the Island was reduced from 54 to 53 during the year by the closing of the Kollupitiya and Maradana Opium Depôts in the Municipality of Colombo, owing to a decrease in the number of consumers and the opening of a new Central Depôt in Forbes road for consumers and vederalas served by the former two depôts in previous years. There was in consequence a saving on account of house rent and salaries.

Forty-two new consumers were added to the Register on purely medical grounds under section 11, sub-section (4), of Ordinance No. 5 of 1910 ; 59 consumers were registered the previous year. The total number of registered consumers served from the opium depôts in the Island during the year was 8,647, as against 9,908 in 1922, 10,645 in 1921, and 11,842 in 1920. Of these, 666 consumers obtained smoking opium in 1923, 780 in 1920.

The number of vederalas who purchased opium during the year was 2,710, as against 2,812 in 1922. 4,264 lb. of eating opium and 566 lb. of smoking opium were sold to consumers and vederalas during 1923, 4,613 lb. and 636 lb. respectively in 1922. This decrease in the sales during the year of both kinds of opium was due to deaths among consumers. Vederalas and new consumers are now allowed eating opium only, and it is hoped that in about another period of ten years smoking opium will not be needed and opium divans where smokers congregate will disappear.

It is remarkable that whereas 61,324,439 grains of eating opium and 12,462,990 grains of smoking opium were sold ten years ago—in 1913—only 29,849,182 grains and 3,963,025 grains respectively, were sold in 1923, a fall in the sale of eating opium of 51·32 per cent. and of smoking opium of 68·2 per cent. in a decade.

There was no change in the selling price of opium. Eating opium was sold for 1½ cent per grain and smoking opium for 2 cents per grain.

The following is a statement of opium sold and amounts realized during the year 1923 :—

During the Quarter ended	Eating Opium.					Smoking Opium.					Total realized.			
	Quantity sold.		Amount realized.			Quantity sold.		Amount realized.						
	Grains.		Rs.	c.		Grains.		Rs.	c.		Rs.	c.		
March 31, 1923	..	7,632,509	..	114,583	53	..	1,061,050	..	21,221	0	..	135,804	53	
June 30, 1923	..	7,413,681	..	111,327	75	..	1,012,850	..	20,257	0	..	131,584	75	
September 30, 1923	..	7,508,458	..	112,750	13	..	966,550	..	19,331	0	..	132,081	13	
December 31, 1923	..	7,294,534	..	109,536	67	..	922,575	..	18	451	50	..	127,988	17
<hr/>														
Totals for 1923	..	29,849,182		448,198	8		3,963,025		79,260	50		527,458	58	
<hr/>														
Totals for 1922	..	32,294,774		484,973	52		4,451,650		89,033	0		574,006	52	
<hr/>														

The contract entered into by the Ceylon Government with the Government of India for the purchase of opium at the rate of Rs. 4,000 per chest of 40 balls of opium continued during the year, and 30 chests of opium were imported in 1923, 2,050 balls of opium remained on December 31, 1922, 1,620 balls were converted into eating and smoking opium during the year, and there was a balance of 1,630 balls in the store at the end of the year.

26 lb. and 274 grains of hard opium were received at the Government Opium Store during the year from the Principal Collector of Customs and from Police Magistrates in different parts of the Island. This quantity represents opium smuggled into the Island and seized by the Customs and the Police.

1,620 balls of opium were converted into 5,203 lb. 3½ oz. 117 gr. of eating and smoking opium during the year, and this is an average of 3 lb. 3¾ oz. of eating and smoking opium per ball.

The sum of Rs. 4,936·60 was realized by the sale of opium preparations in 1923, as against Rs. 5,722·93 in 1922. New rules dated February 6, 1923, in substitution for rule No. 46 of the rules dated June 16, 1915, made under "The Opium Ordinance, No. 5 of 1910," were published during the year in the *Ceylon Government Gazette* No. 7,313 of February 23, 1923.

45. *Medical Work in connection with Railway Extensions.*—The year under review has, on the whole, proved to be an improvement on the preceding, both in the incidence and the severity of the diseases met with. This is due to more stabilized conditions and to the fact that as the various stations are opened and inhabited, the diseases mostly prevalent show a distinct inclination to abeyance amongst those who have by long residence secured comparative immunity by acclimatization.

Unlike previous years the early part was not attended by epidemic malaria, but unexpected rain in the second quarter led to a rather widespread outbreak which waned towards the latter part of May.

The following were the hospitals and dispensaries on the extensions :—Maho hospital, Habarana dispensary with clearing station, Minneriya dispensary, Topawewa hospital, Mahaweli-ganga branch dispensary, Punanai dispensary, Oddaimavadi hospital, Kantalai hospital, Railhead dispensary, and Galoya branch dispensary on the Batticaloa-Trincomalee Light Railway; Madurankuli hospital on the Puttalam Extension; and a temporary dispensary on the Badulla Extension to meet rather a severe outbreak of malarial fever during October and November.

These institutions were run on lines exactly similar to those obtaining in the Civil Medical Department. They were adequately equipped and well stocked with drugs, and provisioning was done by contractors, and they were well staffed with trained attendants.

Kantalai hospital was enlarged by the addition of two wards to meet increased demands and Topawewa hospital by one ward.

In addition to the treatment afforded at the various hospitals and dispensaries, regular fixed visits were paid to all lines. For this purpose the extensions were divided into sections, each attached to a dispensary, special visits were also paid in cases of emergency. On these visits all sick were prescribed for and those requiring indoor treatment directed to hospital. The clearing station at Habarana houses all sick awaiting transport to Maho, where they are met by a stretcher party and conveyed to hospital. District departmental lorries, where available, were also used as a means of transport. These arrangements were supplemented by expedients to meet exigencies as they arose. Several destitute cases had to be provided for and repatriated.

An approximate estimate of the number of coolies employed is impossible, as figures furnished from month to month show wide variation. Labour migrates from section to section, and is never constant in any area. A rough estimate for the Batticaloa-Trincomalee Light Railway would be 5,500 to 6,000; for the Puttalam Railway 600 to 700; for the Harbour Rail Connection 250 to 400; for the Main Line Duplication 750 to 1,000; and for the Badulla Railway, where the work is nearly completed, 300. On Main Line Duplication the labour is mostly recruited locally from the villages through which the line runs, and a large portion of the labour on the Badulla Railway is also of this description, departmental labour is composed of gangs in constant employment on departmental account of Tamils and Sinhalese who have been on the works for long periods. They are well provided for with lines and food and being therefore better looked after they represent the more efficient class of coolies employed on the extensions.

Contract Labour represents a force constantly being renewed by gangs brought in to replace those sent away owing to illness, and these are inefficient for want of continued residence and acclimatization. This is the class of labour amongst whom malaria is most rife.

Village Labour forms a fair proportion of the labour on certain sections.

Quinine was given to all the coolies as a prophylactic, and 75 per cent. of the labour force worked during the fever seasons.

Sanitation.—The lines and surroundings are kept clean. Each apothecary is allowed three special coolies for this work, lines are drained and the jungle cleared around them, all refuse and receptacles for water removed and buried, hollows and pits are drained and filled, borrow pits are drained into each other and its natural courses. Individual cleanliness and personal hygiene is urged on all occasion.

The total number of patients treated in the Railway Extensions hospitals was 3,077. Of these, 134 died, 2,843 were discharged, and 100 remained at the end of the year. The death-rate for the year was 4·35 per cent. There were 2,228 admissions with 71 deaths the previous year. The principal causes of death were pneumonia 56 and dysentery 32, the former was due to exposure during attacks of malarial fever. 46,652 cases were treated at the dispensaries, as against 13,904 cases in 1922.

46. *Medical Inspection of Schools.*—Schools in the Uva District, in Jaffna, in Colombo, and the Western Province, and in Kandy, and Galle were inspected during the year by Dr. H. E. Ekanayake, Medical Inspector of Schools.

(a) *Schools in the Uva District.*—Seven English schools in Badulla, Bandarawela, and Welimada were inspected with a total number of about 750 children.

In Badulla the urgent problem was the virulence of the epidemic of malaria. The teachers were urged to insist on sanitary habits and the administration of quinine to all ailing children, and advised to keep a register of all malarial cases where the incidence of this disease is at all severe, so that a thorough synchronization of infected children could be assured.

The sanitary conditions of most of the schools were fair.

(b) *Schools in Jaffna*.—The chief points to which attention was directed were (1) the prevalence of itch, (2) absence of proper latrine accommodation, and (3) the degree of malnutrition among the children. The extensive prevalence of itch as an endemic skin disease in the Northern Province was amply proved at the inspection of the two large colleges, nearly twenty-five per cent. of the pupils being affected. Judging from the experience of these two schools there is no doubt that a wholetime school Medical Officer for the Northern Province is called for, the schools are as numerous as in the Western Province, and the health of the children certainly worse.

(c) *Schools in the Western Province*.—A certain number of schools were visited and individual examinations were made of children in the English schools. In the vernacular schools inquiry was directed towards the sanitary condition of the school-houses and the general health of the pupils. There were serious defects both in buildings and sanitary conveniences, and the children suffered from hookworm and malaria.

(d) *Schools in Kandy and Galle*.—All the new admissions and the ailing cases of the previous years were examined. The interest taken by the teachers in the inspection was maintained and many of the children had received treatment. The absence of facilities for dental treatment in these towns presents a serious difficulty in securing the full benefits of medical inspection. Even in Colombo no conservative treatment can be offered to the children of the poorer schools, and only extraction work is available at the two clinics. Dr. (Mrs.) Aldons with Nurse Jansz carried out the inspections of the girls schools. They visited sixty-six schools during the year and examined new admissions. Dr. Aldons reports that the head teachers in several schools do not pay sufficient regard to the teaching of personal hygiene, and that pediculosis among the children is still prevalent.

In all some 8,588 children were medically examined and defects or ailments found in 2,158 of them.

Attendance at the two school clinics in Colombo is increasing, and the operative treatment of tonsils and adenoids is becoming more popular with parents. 565 children paid a total number of 1,364 visits during the year; of these, 237 were eye cases, 132 throat, 4 nose, and 19 ear, and 173 suffered from other diseases.

47. *Medical Aid to Immigrant Coolies*.—The number of immigrants to Ceylon who passed through the Mandapam Depôt during the year under review was 132,709, as compared with 125,846 the previous year. Of these, 90,289 were estate labourers and 42,420 were miscellaneous passengers, the number in 1922 having been 78,106 estate labourers and 47,740 miscellaneous passengers. There has been a falling off in the number of passengers, but as regards estate coolies the number passed through to Ceylon, viz., 90,289, stamps 1923 as the second heaviest year since the opening of the permanent camp in 1917, the record year having been 1919, with a total of 112,195 estate labourers. Improved conditions in Ceylon attracted a large proportion of the labour force, while a certain amount of agricultural depression in India, combined with the advantageous terms under which emigration from India to Ceylon is now permitted, operated beneficially in producing a large increase in the number of estate coolies for Ceylon during the year.

The Indian Emigration Act came into force on March 5. The actual working began on June 1, the date on which the permanent Protector of Emigrants and the Medical Inspector appointed by the Madras Government took up duties. Several registers and returns in terms of the Indian Emigration rules are being maintained since that date. Mandapam Camp has been licensed as a "place of accommodation" under the Act, to be used for the reception and lodging of emigrants about to embark for Ceylon. For each emigrant permitted by the Protector to embark a fee of Rs. 2 is paid to the Indian Government by the Ceylon Emigration Commissioner, Trichinopoly. From June 1 to December 31, out of a total of 64,118 estate coolies passed to Ceylon, there were 36,697 emigrants on whom this fee was levied, the rest being classified as non-emigrants, owing to their residence in Ceylon for not less than 5 years or as being members of the family of those resident in Ceylon for that period.

All expenses in connection with the recruitment, accommodation, transport, and subsistence of immigrant labourers are paid out of the Immigration Fund, which is in the hands of the Controller of Indian Immigrant Labour, Colombo.

All buildings and roads in camp were maintained in good order. Extensions to the vegetable room and rice-cooking room of the Hindu kitchen, one block of 12 units for sweepers, and bathing troughs for 10 cooly wards were completed during the year. An additional sea-water reservoir for the continuous flushing of all latrines in camp and bathing troughs for the remaining cooly wards have been sanctioned for 1924.

The general sanitary condition of the camp continues to be very satisfactory. The Sanitary Commissioner inspected the camp in September, and the several recommendations made by him are being given effect to, as far as funds permit. The construction of a large size incinerator of the Powell-Snodgrass type, with a windscreen round it, and a cement platform for sorting the rubbish is an urgent need, as the incinerator in use at present cannot effectively deal with all the camp refuse and sweepings. A sanitary brigade consisting of an overseer and 6 coolies has been sanctioned for work in connection with the anti-malarial scheme, and they will be employed for about four months of the year in the filling in of stagnant swampy pools and hollows, and in oiling operations.

Owing to the heavy rainfall in the month of January several washaways occurred, and from January 10 to 20 the train service on the Ceylon Government Railway was suspended and a very large number of coolies and miscellaneous passengers were held up in camp. These left camp on January 21 and were conveyed from Talaimannar by a special train which left at the usual hour. On January 25 the mail train from Talaimannar conveying the estate coolies from camp was wrecked through a breach on the line between Madawachchi and Anuradhapura. One escort peon and 11 estate coolies were killed and 16 were injured as the result of this accident. A gratuity of Rs. 400 out of Tin Ticket funds was awarded to the widow and children of the deceased peon.

From January 26 to 31 all coolies and passengers were detained in camp owing to the suspension of the train and steamer service, and on February 1 they left by special train, which arrived in camp at about 5 A.M. A day service instead of the night mail was begun on February 1, which continued for a month and a half, and on March 15 the night train service on the Ceylon Government Railway was resumed. During the period of continuance of the day service the work in camp had to be done at unusual hours and under trying conditions in order to meet the requirements of the inconveniently early morning train.

736 cases were claimed by relatives or were rejected as unfit in 1923, as compared with 506 in the preceding year. The majority of the cases were claimed by their relatives, and after due inquiry were sent back to their villages in India.

181 coolies, who were recruited by the Ceylon Labour Commission, were passed for the Salt Department.

56 steamer crews totalling 2,557 were passed to Ceylon during the year. They came from Bombay and Calcutta and left camp after vaccination and disinfection.

The general health of the camp was very satisfactory. Early in the year the Government Malariologist made a detailed mosquito survey and reported fully on the incidence of malaria in the camp. He is of opinion that there is little endemic malaria within the camp, and that the majority of the infections are contracted outside. The recommendations made by him are being carried out. A number of larvivorous fish have been introduced into the wells and appear to be thriving in them. All hollows are being filled, the non-essential wells closed, and all pools regularly oiled.

1,569 patients were treated in camp for malaria during the year, as against 1,208 the previous year. Of these, 459 cases occurred among the camp staff, as against 445 in 1922.

12,912 patients were treated at the camp dispensary. They paid a total number of 24,100 visits. There were 31 deaths in camp during the year, including 21 deaths in the camp hospital. 980 in-patients were treated, and the death-rate for the year was 2.14 per cent. There was no case of plague; 2 cases of cholera occurred and 1 proved fatal; 9 cases of smallpox were detected; of which, 5 were amongst estate labourers, 2 amongst passengers, and 2 amongst the staff. Three estate labourers and 1 passenger died of confluent smallpox.

98,698 primary and re-vaccinations were performed during the year; and of these, 40,265 were successful.

Government Hospitals and Dispensaries in Planting Districts for Immigrant Coolies.—There are 59 such hospitals with accommodation for 4,988 patients, and staffed with Medical Officers, nurses, and attendants. Apart from the out-patient department attached to each of these hospitals there are 82 out-door dispensaries not attached to hospitals in these planting areas.

Medical Inspection of Estates.—The inspecting staff consisted of three Inspecting Medical Officers and three Assistants, the latter were appointed in October, 1923.

The area under the cultivation of rubber and tea is divided into three inspectorates—

- (1) Central Province under the Inspecting Medical Officer, Kandy;
- (2) Uva, North-Western Province, and eastern half of Sabaragamuwa under the Inspecting Medical Officer of Uva;
- (3) Western and Southern Provinces and western half of Sabaragamuwa under the Inspecting Medical Officer of Colombo.

The number of estates scheduled for inspection was 2,568. The average number of inspections done by each Inspecting Medical Officer during the year was 25 a month.

Sixty-nine estate hospitals were inspected, and the estates they served received a rebate on the duty paid by each on the export of its produce in proportion to the marks gained at the inspection. The sum of Rs. 121,905 was paid by Government as rebate (under the provisions of section 27 of Ordinance No. 9 of 1912) from October 1, 1922, to September 30, 1923. The cost of construction, maintenance, equipment, and salary of officers and staff of these hospitals are borne by the proprietors of estates. Free drugs to a value not exceeding 50 cents per annum for every labourer employed on the estates are given by Government and drugs over that amount supplied at cost price.

All the estates gained over 50 per cent. of marks, and some as high as 95 per cent. The majority of these hospitals are well constructed and well equipped, and contribute not a little to the welfare of the labour force. The number of dispensaries on estates was 489. Free grants of drugs to the value of Rs. 193,363.27 were given to estate hospitals and estate dispensaries during the year.

Lines.—In the year under review good progress was made in the construction of new lines, specially in the Central Province and a large number of old lines were remodelled and brought up to the standard required. The gloomy windowless lines are rapidly disappearing and their place is being taken by well constructed lines of stone or brick provided with windows and proper ventilation. The verandah space which in past years was misused for the housing of goats, fowls, and calves is now free of these, and in many lines are surrounded by dwarf walls and kept in a clean and sanitary condition. The drainage is being continuously improved by the provision of stone paved ramps and permanent stone and cement drains which greatly helps to reduce the incidence of anchyostomiasis. Nearly all the estates visited were carrying out programmes for the complete renovation of their lines in three years.

Line Compounds on most estates were kept clean and well swept. According to Government regulations they should extend to a width of 40 feet all round a line. Where possible this has been done and trees have been cut down to permit of more sunlight and fresh air.

Latrines.—New and permanent latrines are rapidly replacing the old wooden structures which were put up hastily in 1917. The number of all-iron portable latrines sold by three firms in Colombo was 3,834, sufficient to serve 57,570 coolies, and the sale of this type of latrine is rapidly increasing.

Besides these a number of brick and cement permanent latrines have been built.

Water Supply.—Some estates are provided with a piped water supply of excellent quality, but the majority take their supply from wells protected by a parapet wall, cement collar, and drain. The use of water from streams and open channels is condemned. The improvement in the water supply to cooly lines is brought to one's notice by the fact that while severe epidemics of dysentery existed in villages, many of the neighbouring estates showed a clean record in that respect.

Child welfare work may be described under three heads according to the age of the child:—

(1) *Prenatal Care of the Mother and her Confinement.*—When the expectant mother reports herself unable to work free rice is issued and in some estates, provided with a maternity ward, she is admitted and fed free. Her confinement is attended by the trained midwife when one is on the staff, otherwise the line midwife is given three days' name to attend on her. The mother is given a cash bonus varying from Rs. 5 to Rs. 2.50 and half bushel rice. If any delay occurs the Government Medical Officer is sent for. Every encouragement is given to Indian women to use the well-equipped maternity wards in Government and estate hospitals, and they are gradually overcoming their prejudice against them.

(2) *Infant Welfare from Birth to Two Years*.—Indian mothers with rare exceptions are able to nurse their infants, but should the supply of milk fail, cow milk or any infant's food recommended by the District Medical Officer or apothecary-in-charge is given by the estate.

On estates with hospitals and dispensaries children are inspected weekly by the midwife and dispenser at the crèches and instruction given to mothers as to washing, feeding, and general care of infants. Nursing mothers are given light work in the neighbourhood of lines and crèches. The infant is kept in charge of the crèche attendant and the mother allowed at regular intervals to nurse it. Some estates give the mother a bonus of Rs. 2.50 in the third, sixth, ninth, and twelfth month of the infant's age.

(3) *Child Welfare from Two Years to Working Age*.—All children under working age are sent to a crèche, and in the absence of one they are kept in a line room in charge of an attendant. The older children go to school when one exists. In the forenoon each child receives a cooked meal of rice congee made with coconut and jaggery or of rice and curry. On some estates mothers of children under working age are given one-eight bushel rice for each child.

On the whole, there is undoubtedly a great improvement in the general health of the children.

48. The following is a list of medical and sanitary requirements that have been asked for during the past few years but for which provision has not been made for want of funds in some cases :—

(1) *A Medical Research Institute*.—Research on many problems is required and there is no provision for the requisite staff and buildings. It has been asked for many years.

(2) *A Dental Institute*.—Provision for this was included in the Draft Estimates for 1923–24 but it was not sanctioned. It is being asked for in the 1924–25 Estimates. There is no provision in Ceylon whereby the poor can receive dental treatment, and the establishment of such an institute would also provide a means where school children requiring such treatment could be referred by the school Medical Officers.

(3) Complete plans for the rebuilding of the Medical College were drawn up and agreed to several years ago, but so far only the Anatomy Block has been provided. There is urgent need for an up-to-date Physiological Laboratory and a Pathological Laboratory and Museum. The satisfactory training of medical students is seriously handicapped for want of these.

(4) The teaching staff of the Medical College and hospital requires augmenting if we are to meet the recently amended requirements of the General Medical Council: a 5th Physician, a Clinical Pathologist, and a Professor of Physiology, who is also Registrar of the Medical College, have been appointed; a qualified assistant to the Professor of Physiology, a wholetime Professor of Pathology, a Medical Registrar, a Surgical Registrar on the staff of the General Hospital, and a 5th Surgeon are required.

(5) Rebuilding the non-paying section of the General Hospital: plans and estimates were approved of some years ago, but nothing has been done as yet. Here, again, the want of modern ward accommodation with clinical "side" rooms materially hampers the training of students and the constant overcrowding shows the need for more accommodation for patients.

(6) Suitable office accommodation for the Sanitary Department is also an urgent need, and so also is provision for an increase in the medical staff of that department.

(7) As regards general sanitation a materially increased provision for improved water supplies to various towns and villages and for additional public latrines is a pressing necessity.

(8) An increase in the medical staff available for parangi work is a necessity. Six itinerating Medical Officers on parangi duty are now working in the field and it is hoped to provide three additional officers in the 1924–25 Estimates. The campaign is progressing favourably with the limited staff.

(9) Plans and estimates for a new Infectious Diseases Hospital for Colombo were approved of some years ago and the land acquired for the same. The building has been commenced and it is hoped to complete it in two years.

(10) The hospital attached to the central jail in Colombo is of an obsolete and unsatisfactory type; the building of a new hospital in Colombo has been started.

(11) A new prison to replace the one at Mahara (11 miles from Colombo) is badly needed. The site at Mahara is very malarious, and the health of the prisoners and the staff there is materially affected.

(12) Many urgent medical additions to existing hospitals in the planting districts, and otherwise especially at Kandy, have been included for consideration in the estimates, but have had to be deleted owing to lack of funds.

(13) The building of the male portion of the Lunatic Asylum at Angoda is a matter of urgent necessity, so that the inmates may be moved from the present overcrowded asylum, and it is hoped that the work will be proceeded with at once.

SECTION VII.—SCIENTIFIC.

49. *Government Bacteriological and Pasteur Institutes*.—Report of the Director, Dr. Lucius Nicholls, for the year 1923 :—

A.—BACTERIOLOGICAL INSTITUTE.

1. *Routine Work*.—The number of specimens examined during the year was 10,405. The fees which were received for the examinations of specimens, not sent from Government institutions, amounted to Rs. 6,650.50 and were credited to revenue.

The character of the examinations carried out is shown in the following table :—

Specimens.	Official.	Private.	Total.	Positive.	Negative.
Blood for typhoid ..	1,493 ..	26 ..	1,519 ..	643 ..	876
Blood for para-typhoid A ..	651 ..	20 ..	671 ..	16 ..	655
Blood for para-typhoid B ..	651 ..	20 ..	671 ..	— ..	671
Blood for Wasserman test ..	1,462 ..	214 ..	1,676 ..	864 ..	812
Blood for malaria ..	58 ..	23 ..	81 ..	18 ..	63
Blood for filaria ..	1 ..	— ..	1 ..	— ..	1
Sputum for tubercle bacilli ..	135 ..	35 ..	170 ..	47 ..	123
Milk for tubercle bacilli ..	— ..	1 ..	1 ..	— ..	1
Cow mucus for tubercle bacilli ..	1 ..	— ..	1 ..	1 ..	—
Sputum for pneumococci ..	2 ..	— ..	2 ..	2 ..	—
Urine for tubercle bacilli ..	6 ..	1 ..	7 ..	— ..	7
Scrapings for tubercle bacilli (smears) ..	2 ..	— ..	2 ..	1 ..	1
Rats for <i>B. pestis</i> ..	3,661 ..	— ..	3,661 ..	1 ..	3,660
Human material for <i>B. pestis</i> ..	78 ..	— ..	78 ..	27 ..	51
Secretions for gonococci ..	89 ..	7 ..	96 ..	18 ..	78
Secretions for diphtheria bacilli ..	31 ..	18 ..	49 ..	29 ..	20
Dogs, &c., for rabies ..	44 ..	— ..	44 ..	33 ..	11
Evacuations for cholera vibrio ..	15 ..	— ..	15 ..	— ..	15
Specimens for <i>B. typhosus</i> ..	3 ..	7 ..	10 ..	2 ..	8
Scrapings for Spirochætea ..	3 ..	15 ..	18 ..	5 ..	13
Tissue for examination ..	7 ..	1 ..	8 ..	— ..	—
Fæces for anchylostomiasis ..	60 ..	17 ..	77 ..	50 ..	27
Fæces for dysentery ..	18 ..	35 ..	53 ..	23 ..	30
Secretions for leprosy ..	16 ..	2 ..	18 ..	6 ..	12
Urine for chemical examination ..	26 ..	6 ..	32 ..	— ..	—
Urine for bacteriological examination ..	16 ..	5 ..	21 ..	— ..	—
Urine for microscopical examination ..	1 ..	3 ..	4 ..	— ..	—
Miscellaneous specimens for examination ..	51 ..	11 ..	62 ..	— ..	—
Water for examination ..	29 ..	25 ..	54 ..	— ..	—
Auto-vaccine ..	11 ..	9 ..	20 ..	— ..	—
Anti-typhoid vaccine (doses) ..	120 ..	118 ..	238 ..	— ..	—
Gonococcal vaccine (doses) ..	972 ..	5 ..	977 ..	— ..	—
Staphylococcal vaccine (doses) ..	— ..	30 ..	30 ..	— ..	—
Anti-plague vaccine (doses) ..	2 ..	— ..	2 ..	— ..	—
<i>B. coli</i> vaccine (doses) ..	12 ..	— ..	12 ..	— ..	—
Tuberculin (doses) ..	24 ..	— ..	24 ..	— ..	—
Total ..	9,751	654	10,405	—	—

2. It is interesting to note that out of 671 specimens examined for para-typhoid B. all were negative. Similar results have occurred in past years, and several thousand specimens of blood have been examined during the last ten years and not one specimen has agglutinated with the organism of para-typhoid B.

3. The number of specimens submitted for the Wasserman continues to increase as in past years.

B.—PASTEUR INSTITUTE.

1. The number of patients who were treated at the Pasteur Institute during 1923 was 336, this is a small increase over the number treated the previous year.

2. Since the opening of the Institute, a return circular has been sent to each patient every three months for one year after treatment, or in the case of an illiterate the circular is sent to the police, a headman, the estate superintendent, or other responsible person, and in this way the history of each patient after treatment has been followed.

Up to the end of 1922 1,441 patients have received treatment, and 13 of these have died of hydrophobia, who were treated within one week of being bitten. These are considered to be failures. Therefore the percentage of failures is 0·9 per cent. for all patients treated.

3. I had gleaned the impression that there were more failures among young patients than among adults, and this is supported by the statistics of the Institute, which are set out in the following table :—

Year.	Male Adults.	Female Adults.	Males under 15.	Females under 15.	Total.
1918 ..	102 ..	29 ..	44 ..	16 ..	191
1919 ..	260 ..	75 ..	136 ..	51 ..	522
1920 ..	115 ..	57 ..	59 ..	41 ..	272
1921 ..	120 ..	44 ..	54 ..	31 ..	249
1922 ..	99 ..	39 ..	50 ..	19 ..	207
Total ..	696	244	343	158	1,441
Failures ..	6 ..	Nil ..	5 ..	2 ..	13
Percentage of failures ..	0·86 ..	Nil ..	1·45 ..	1·26 ..	0·9
Percentage of failures for adults is 0·63.					
Percentage of failures for persons under 15 is 1·39.					

Though the numbers in the statistics are too small to permit definite deductions from them it will be seen that the failures with patients under 15 years of age are more than double of those which have occurred in adults. Also these statistics show that failures have been more frequent with male patients than with females.

If statistics with larger numbers show that these smaller numbers indicate the true state of affairs, an explanation of them is necessary.

As concerns the relative incidence between males and females, it is possible that it is connected with the severity of the bites, men and boys are more likely to struggle with a mad dog than are women and girls, and consequently often receive deep lacerated wounds, which are infected with a large amount of the virus. It is exceedingly difficult to cauterize severe wounds, and the anti-bodies formed in the system during inoculations are able to neutralize only a limited amount of virus.

Though this may be the explanation of the different incidence of failures between the men and women, it does not appear to apply to the failures among adults and children respectively.

The greater number of deaths in children is probably because they possess less immunity than adults.

RESEARCH WORK.

1. Two papers have been written during the year on work done by those working at this Institute, they are appearing in the Ceylon Journal of Science (Medical Section) which has recently been started under the ægis of Government.
2. The Director of these Institutes acted as Medical Superintendent of the Lunatic Asylum, and advantage was taken of this acting appointment to investigate the prevalence of syphilis among the 1,200 odd inmates of the asylum.
- The Wasserman reaction was done with 1,218 samples of blood, and the following were the results :—

	Samples Tested.	Wasserman. xx.	Wasserman. x.	Wasserman Negative or Faint Trace.	Anti-complementary.	Percentage Positive.
Males	725	50	46	624	5	13·2
Females	493	53	24	416	0	15·6
Total	1,218	103	70	1,040	5	14·7

Certain minor errors may have crept into this investigation, but it shows that about 14 per cent. of persons admitted to the asylum have been infected with syphilis. It is an astonishing fact that not one of these 1,218 patients were suffering from General Paralysis of the Insane or from Locomotor Ataxy, these diseases are very seldom seen among Sinhalese and Tamils.

Unfortunately there are no statistics of similar investigations in other tropical countries. In European countries the incidence of syphilis among lunatics is certainly greater than it is in Ceylon.

It may be assumed that the weak-minded are more liable than the normal minded to contract venereal diseases, and normal persons who have contracted syphilis are more liable to mental derangements than others ; consequently it follows that if syphilis is very prevalent in Ceylon there would be a high incidence of the disease among the patients in the asylum.

I have formed the opinion from this investigation that syphilis is less prevalent in Ceylon than in many other counties.

BACTERIOLOGICAL EXAMINATION OF ICE.

In order to obtain some information regarding the bacterial contents of ice as manufactured and distributed locally, ten samples were examined during the year. The samples were obtained from the daily deliveries of ice at this Institute.

Each sample on receipt was repeatedly washed in frequent changes of sterile distilled water until only a small portion of ice remained. This was allowed to melt at room temperature in a sterile flask, and the resulting water was examined without delay.

Table I. shows (a) the number of micro-organisms present in 1 cc. of each sample, and (b) the smallest quantity of each sample in which lactose fermenting micro-organisms could be detected.

Table II. gives the reactions and identity of ten lactose fermenting organisms isolated without selection from 10 cc. of each sample.

Analysis of the results shows that one sample at least, viz., C, was unfit for human consumption, and that two samples (G and I) were not above suspicion. In the case of sample C the bacterial count was low, but approximately 50 per cent. of the lactose fermenting organisms present were typical *B. coli communis* (Escherich).

In samples G and I the number of micro-organisms per cc. was excessive and the lactose fermenting bacteria far too numerous. Of the remaining samples, A and F were of inferior quality, and samples B, D, E, and H were of fair quality. In each case, however, the lactose fermenting organisms were too numerous. Sample J proved to be of exceptionally good quality.

The results may be briefly summarized as follows :—

Good	1
Fair	4
Inferior	2
Suspicious and unsafe	2
Unfit for consumption	1

There is a popular idea that ice is safe for consumption, because it is believed that any micro-organisms which may have been present in the water, from which the ice was made, have been “frozen to death.” Probably this is why many people appear to regard it as a safe practice to add a lump of ice to a drink, and disregard its contacts with dirty sacks, sawdust, and many hands. However, it is a fact that many pathogenic organisms can withstand exceedingly low temperatures. For instance, Macfadyen many years ago showed that *B. typhosus*, *B. dysenteriae*, and other germs survived for many weeks in a bath of liquid air at a temperature of over 250 degrees of frost.

Cold has a preservative action on many micro-organisms; *B. dysenteriae* will survive almost indefinitely in ice or iced water, but it dies out in a few days in many natural waters at tropical temperatures.

From this it will be realized that in the preparation, the handling, and distribution of ice for human consumption as much care is required as with any other provision.

Table I.

Sample.		Date examined.		Number of Organisms per cc. at 37° C, 24 hours.		Smallest quantity in which lactose fermenting bacteria could be detected. cc.	
A	..	January	31, 1923	..	249	..	0·1
B	..	February	5, 1923	..	134	..	0·5
C	..	February	12, 1923	..	261	..	0·1
D	..	February	20, 1923	..	186	..	0·5
E	..	February	21, 1923	..	194	..	0·5
F	..	February	23, 1923	..	595	..	0·1
G	..	February	26, 1923	..	1,035	..	0·01
H	..	June	12, 1923	..	594	..	0·5
I	..	June	20, 1923	..	1,206	..	0·01
J	..	July	9, 1923	..	72	..	5

Table II.

Sample.	No. of Colony.	Motility.	Lactose.	Saccharose.	Dulcite.	Adonite.	Inosite.	Inulin.	Indole.	V. and P. Reaction.	Redn. Nitrates.	Identity of Organism.
A	1	+	AG	AG	AG	0	0	0	0	0	+	Var. M 73
	2	0	AG	AG	0	AG	AG	0	0	0	+	Var. <i>B. lactis aërogenus</i>
	3	0	AG	AG	0	AG	0	0	0	0	+	Var. <i>B. gasoformans</i>
	4	0	AG	AG	0	AG	0	0	0	0	+	do. do.
	5	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	6	0	AG	AG	0	AG	AGs	0	0	0	+	Var. <i>B. lactis aërogenes</i>
	7	0	AG	AG	AG	0	0	0	0	+	+	Var. M 73?
	8	0	AG	AG	AG	0	0	0	0	+	+	do. do.
	9	0	AG	AG	AG	0	0	0	0	+	+	do. do.
	10	0	AG	AG	AG	0	0	0	0	+	+	do. do.
B	1	0	AG	AG	AG	0	AG	0	0	+	+	M 75
	2	0	AG	AG	AG	0	AG	0	0	+	+	do.
	3	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	4	+	AG	AG	0	0	0	0	0	+	+	do.
	5	+	AG	AG	0	0	0	0	0	+	+	do.
	6	0	AG	AG	AG	0	A	0	0	+	+	M 75?
	7	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	8	0	AG	AG	AG	0	AG	0	0	+	+	M 75
	9	0	AG	AG	AG	AG	AG	0	+	+	+	M 67
	10	0	AG	AG	AG	0	AG	0	0	+	+	M 75
C	1	+	0	AG	0	0	0	0	0	0	+	Bac. “P” (Clemesha)
	2	+	AG	0	AG	0	0	0	+	0	+	<i>B. coli communis</i>
	3	+	A	0	0	0	0	0	+	0	+	?
	4	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	5	+	AG	AG	AG	AG	0	0	0	0	+	Var. L 27
	6	+	AG	0	AG	0	0	0	+	0	+	<i>B. coli communis</i>
	7	0	AG	AG	0	AG	0	0	0	0	+	Var. <i>B. gasoformans</i>
	8	+	AG	0	AG	0	0	0	+	0	+	<i>B. coli communis</i>
	9	+	AG	0	AG	0	0	0	+	0	+	do. do.
	10	+	AG	0	AG	0	0	0	+	0	+	do. do.

Table II.—contd.

Sample.	No. of Colony.	Motility.	Lactose.	Saccharose.	Dulcite.	Adonite.	Inosite.	Inulin.	Indole.	V. & P. Reaction.	Redn. Nitrates.	Identity of Organism.
D	1	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	2	0	AG	AG	AG	0	0	0	+	0	+	<i>B. neapolitanus</i>
	3	0	0	0	0	0	0	0	0	0	0	Bac. L 33 or L 36
	4	0	AG	AG	AG	0	As	0	0	+	+	Var. M 75
	5	0	AG	AG	AG	AG	AG	0	+	+	0	Var. M 68 or M 67
	6	0	AG	AG	AG	0	0	0	+	0	+	<i>B. neapolitanus</i>
	7	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	8	0	AG	AG	AG	0	As	0	0	+	+	M 75
	9	0	AG	AG	AG	AG	AG	0	0	+	+	M 67
	10	0	AG	AG	AG	0	0	0	+	0	+	<i>B. neapolitanus</i>
E	1	0	AG	AG	0	AG	0	AG	+	+	+	M 97
	2	0	AG	AG	AG	0	0	AG	+s	0	0	Var. M 69
	3	0	0	A	0	0	0	0	0	0	0	?
	4	0	AG	AG	AG	AG	0	0	+	+	+	Var. M 66
	5	+	AGD	AGD	0	0	AGD	0	+	+	+	L 51
	6	+	D	D	D	D	D	D	+	+	+s	L 44
	7	0	AG	AG	0	AG	0	AG	+	+	+	M 97
	8	0	AG	AG	0	AG	0	AG	+	+	+	do.
	9	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	10	+	AG	AG	0	0	0	0	0	+	+	do.
F	1	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	2	0	AG	AG	AG	0	AG	0	0	+	+	M 75
	3	0	AG	AG	AG	0	AG	0	0	+	+	do.
	4	+	AG	AG	AG	0	0	AG	0	0	+	M 70
	5	+	AG	AG	0	0	0	0	0?	+	+	<i>B. cloacæ</i>
	6	0	AG	AG	0	AG	AG	0	0	+	+	<i>B. lactis aërogenes</i>
	7	0	AG	AG	0	AG	AG	0	0	+	+	do. do.
	8	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	9	0	AG	AG	AG	0	0	0	+	0	+	<i>B. neapolitanus</i>
	10	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
G	1	+	AG	0	0	0	0	0	0	0	0	Var. M 7
	2	0	AG	0	0	AG	0	0	+	0	+	<i>B. acidi lactici</i> (Huppe)
	3	+	AG	0	0	0	0	0	0	0	0	Var. M 7
	4	+	AG	0	0	0	0	0	0	0	0	do. do.
	5	+	AG	0	0	0	0	0	+	0	+	<i>B. Grunthal</i>
	6	0	AG	AG	0	AG	AG	0	0	+	+	<i>B. lactis aërogenes</i>
	7	0	AG	0	AG	0	0	0	+	0	+	<i>B. Schafferi</i>
	8	+	AG	AG	AG	0	0	AG	0	+	+	M 69
	9	0	AG	0	0	AG	0	0	+	0	+	<i>B. acidi lactici</i> (Huppe)
	10	+	AG	0	0	0	0	0	+	0	+	<i>B. Grunthal</i>
H	1	+	AG	AG	0	AG	AG	0	0	0	+	L 18
	2	0	AG	AG	0	AG	As0	0	0	0	+	M 104
	3	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	4	+	AG	AG	AG	0	0	0	0	?	+	M 73
	5	+	AG	AG	0	AG	AG	0	0	0	+	L 18
	6	0	AG	AG	0	AG	As	0	0	0	+	M 104
	7	0	AG	AG	0	AG	As	0	0	0	+	do.
	8	+	AG	AG	AG	0	0	0	0	+s	+	M 73
	9	0	AG	AG	0	AG	As0	0	0	?	+	M 104
	10	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
I	1	+	AG	0	0	0	0	0	+	0	+	<i>B. Grunthal</i>
	2	0	AG	AG	AG	0	AG	0	0	+	+	M 75
	3	0	AG	AG	0	0	AG	0	0	+	+	L 17
	4	+	AG	AG	0	0	AG	0	+	+	+	L 51
	5	+	AG	AG	0	0	AG	0	+	+	+	L 51
	6	0	AG	AG	0	0	AG	0	0	+	+	L 17
	7	+	AG	0	0	0	0	0	+	0	+	<i>B. Grunthal</i>
	8	0	AG	AG	0	AG	AG	0	0	+	+	<i>B. lactis aërogenes</i>
	9	0	AG	AG	0	AG	AG	0	0	+	+	do. do.
	10	0	AG	AG	0	0	AG	0	0	+	+	L 17
J	1	+	AG	AG	AG	0	0	0	0	+	+	M 73
	2	0	AG	AG	0	AG	AG	0	0	+	+	<i>B. lactis aërogenes</i>
	3	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	4	+	AG	AG	AG	AG	0	0	+	0	+	L 27
	5	+	AG	AG	0	0	0	0	0	+	+	<i>B. cloacæ</i>
	6	+	AG	AG	AG	0	0	0	0	+	+	M 73
	7	+	AG	AG	AG	0	0	0	0	+	+	do.
	8	+	AG	AG	AG	0	0	0	0	+	+	do.
	9	+	AG	0	0	0	0	0	0	+	+	L 3
	10	+	AG	0	0	0	0	0	0	+	+	do.

A cladothrix (dichotoma ?) present in sample F.

Penicillium glaucum present in sample G.

Abbreviations used in Table II.

AG = Acid and gas formation.
D = Medium decolourized.
0 = Test negative.
M = Identification from MacConkey's description.

A = Acid only.
s = Slight.
+ = Test positive.
L = Laboratory reference number. Identification doubtful.

“ SOURED ” MILK.

As is the case in many other countries “ Curdled ” or “ Soured ” milk is used as an article of diet by a large number of the inhabitants of Ceylon. The usual method of preparation is as follows :—A small portion of curd (mudavapukiri, Sinhalese ; thaier, Tamil) obtainable from the local dairyman is introduced into a quantity of cool, but previously boiled milk. The preparation is left undisturbed for 18 to 24 hours, at the end of which time the milk is clotted and ready for consumption. A small portion of the freshly prepared curd is retained to start the batch of “ soured ” milk for the following day.

During the past few months eleven samples of curd procured from different sources in Ceylon have been submitted to bacteriological examination, and the results obtained are set out below.

On comparing the results it will be seen that the samples varied very considerably, both as regards their physical properties and bacterial contents. All the samples produced good clots, but in some cases this was followed by rapid and complete peptonization. (Putrefaction.)

Four of the samples after a few hours developed an offensive odour, characteristic of putrefaction. The number of micro-organisms ranged from 3,870 to approximately 3,650,000 per cc. A streptococcus was present in five samples. Culturally it was indistinguishable from *S. lacticus*, and proved to be non-pathogenic to guinea pigs.

Micro-organisms belonging to the *B. coli* or “ fæcal ” group were present in many of the samples, but particularly so in Nos. 2 and 7. In the latter sample out of 23 micro-organisms isolated from 0·0001 cc. of the curd, seven or 33 per cent. proved to be *B. coli communis* (Escherich). Sample No. 9 was conspicuous, owing to the presence of *B. pyocyaneus*, an organism which occasionally causes choleraic dysentery in Ceylon.

A bacillus of the proteus group was present in two samples and *B. mesentericus* (*fuscus* or *vulgatus*) was found in three samples. Nine samples contained a saccharomyces. Of the eleven samples examined, only three (Nos. 3, 10, and 11) could be considered of good quality from a bacteriological point of view, No. 11 proving exceptionally good in every way.

Samples Nos. 2, 4, 5, 7, and 9 were not fit for human consumption, and the remaining three samples were certainly not above suspicion.

Judging from the samples examined it would appear that clotted milk produced by the action of unsuitable micro-organisms is frequently consumed in mistake for genuine “ soured ” milk, and it is possible that the indiscriminate use of these so-called “ soured ” milks may be the cause of cases of obscure intestinal trouble in infants and adults in Ceylon.

Sample.	Character of Curd.	Peptonization.	Number of Micro-organisms per cc.	Predominant Micro-organisms present.
No. 1, Colombo ..	Firm white clot but inclined to be “ ropy.” No odour	Complete in 72 hours	9,543	<i>B. mesentericus fuscus</i> <i>B. lactis aërogenes</i> <i>B. acidi lactici</i> <i>A saccharomyces</i>
No. 2, Colombo ..	Firm clot. Pale buff colour. Clear whey. Musty odour	Complete in 48 hours	33,500	var. <i>B. megaherium</i> <i>B. cloacæ</i> <i>B. coli communis</i> (Escherich) <i>B. levans</i> <i>A streptococcus</i> <i>A saccharomyces</i>
No. 3, Colombo .. (Maligawatta)	Firm clot. No whey. Faint “ acid ” odour	Nil in 5 days	2,130	<i>A streptococcus</i> <i>A saccharomyces</i> (Pastorianus ?)
No. 4, Jaffna ..	Good white clot. Ropy in 14 hours with a rank cheese-like odour	Complete in 24 hours	24,850	<i>B. mesentericus</i> <i>B. proteus vulgaris</i> <i>A cladothrix(dichtoma?)</i> <i>A saccharomyces</i>
No. 5, Galle ..	White clot with clear whey. Ropy in 24 hours with offensive odour	Complete in 36 hours	70,000 (approx.)	var. <i>B. cloacæ</i> <i>B. proteus</i> <i>A streptococcus</i> <i>Mucor mucedo</i> <i>A saccharomyces</i> (ellipsoideus)
No. 6, Colombo ..	Firm white clot with a trace of whey. Slightly sour odour	Complete in 5 days	18,750	<i>B. mycoides</i> var. <i>B. lactis aërogenes</i> var. <i>B. Grunthal</i> <i>Sacch. ellipsoideus</i>
No. 7, Colombo ..	Firm cream coloured clot. Odour markedly sour	Complete in 48 hours	3,650,000 (approx.)	<i>B. neapolitanus</i> <i>B. coli communis</i> (Esch) var. <i>P. Grunthal</i> <i>B. Schafferi</i> <i>B. cloacæ</i> <i>B. mesentericus vulgatus</i> <i>A saccharomyces</i>

Sample.	Character of Curd.	Peptonization.	Number of Micro-orga-nisms per cc.	Prædominant Micro-organisms present.
No. 8, Colombo . .	Firm clot. Faintly fungoid odour . .	Slight in 5 days	6,540	var. <i>B. cloacæ</i> <i>Sarcina lutea</i> <i>Sarcina flava</i> ? <i>A saccharomyces</i> (var. <i>ellipsoideus</i>) <i>Penicillium glaucum</i>
No. 9, Colombo . .	Fairly firm clot with whey. Slightly green. Putrid odour, 24 hours	Complete in 72 hours	55,500	var. <i>B. acidi lactici</i> <i>B. pyocyaneus</i> <i>A saccharomyces</i> (<i>ellipsoideus</i>) <i>Sarcina rosea</i>
No. 10, Colombo (Kolonnawa)	Firm white clot. No whey. "Acid" odour	Nil in 4 days	3,870	<i>B. lacticus</i> var. <i>B. cloacæ</i> <i>A streptococcus</i>
No. 11, Colombo	Firm white clot. Small amount of whey. Faint acid odour	Nil in 7 days	68,400	var. <i>B. lacticus</i> or <i>Gunteri</i> <i>A streptococcus</i>

Note.—*B. pyocyaneus* was present in all the subcultures originating from No. 9, and all the organisms present in the original curd No. 7 were recovered from successive subcultures made from this sample.

PROPAGANDA.

In all branches of scientific medicine great discoveries have been made within the last few decades, but the practical application of this established knowledge has lagged far behind. Much of this has been due to public ignorance for which medical experts are partly to blame. Consequently propaganda work has taken place from this Department.

Work has been done on two subjects, venereal diseases and malaria. On the former subject two pamphlets issued by the British National Council for Combating Venereal Diseases have been adopted in a modified form so as to suit local conditions. These pamphlets are entitled "Venereal Diseases and their Effects" and "How to Fight Venereal Diseases." Several thousands of these have been printed in English, Sinhalese, and Tamil and are awaiting distribution.

On the second subject, malaria, a small book for teachers, called "Malaria in Ceylon" has been issued. It was written for general educational purposes to show how widespread this disease is throughout Ceylon, the far-reaching effects of it upon the vitality and energy of the population, and to bring home to its readers that malaria is not a necessary evil.

The small book was written in simple language, and the illustrations were made as elementary as possible, for it has been found that elaborate illustrations of small objects greatly magnified are apt to confuse lay readers and make them incredulous.

This book has been translated into Sinhalese and Tamil and the demand for it has been astonishing, so much so that it will be necessary to print over 10,000 copies.

50. *Intravenous Protein Therapy in Septic Polyarthritis* by Dr. E. C. Spaar, Physician, General Hospital, Colombo.—Female, age 50, admitted September 20, 1923, with swelling of shoulder, elbow, wrist, knee, and ankle joints of 3 years duration. She stated that the trouble started with swelling of both knee joints unaccompanied by fever. Four days later the shoulder joints were involved and gradually the swelling spread to the other joints. On examination, the mouth was found very septic with marked pyorrhœa and was undoubtedly the source of the infection. The thoracic and abdominal organs appeared healthy. The pyorrhœa was treated by touching the edges of the gums with a weak solution of tincture of iodine and later of hydrogen peroxide, which was also used as a mouth wash, and one injection of 50 million coli organisms was given intravenously in 10 cc. of normal saline with due precautions on October 4, 1923, in accordance with the technique of Auld and Gow in England and of Pederson in America based on the researches of Nolf, all of whom have done so much to explain and perfect this new method of therapy. No untoward results followed with the exception of severe pain in the elbow joints which was complained of on the following day. Unfortunately the patient refused to remain in hospital for further treatment, but on her discharge on October 8 there was no swelling in the lower extremities, and although the elbow joints were still swollen she was able to flex them and they seemed more supple. There would seem to be a promising future for this method of treatment in suitable cases.

51. *Investigations on the Control of Hookworm Disease—Larval Activities* by Dr. L. Fabian Hirst, Municipal Bacteriologist, Colombo.—The movements and general activities of the mature infective hookworm larvæ are very characteristic and remarkable. Placed in water in a shallow cell, the active larvæ exhibit frequent lashing movements eventually finding their way to the margins of the cell where they remain head outwards in a continual state of agitation.

Movement increases with rise of temperature to blood heat. At lower temperatures movements may not be continuous, larvæ sometimes passing into a resting stage during which there is practically no expenditure of energy.

Larvæ in soil are found in the moisture film covering the soil particles. Their action is exerted between the resistance of the particle and the surface tension of the moisture film. After travelling some distance through soil larvæ became noticeably more transparent due to loss of their food granules which when numerous render them opaque. The smaller the size of the soil particles the greater the surface tension of their moisture film, the greater the resistance to larval movement, and the more rapid the exhaustion of the larval store of energy which cannot be replenished from without.

Observations made in the laboratory indicate that in a soil, such as cabook, permeable to water, but resistant to larval motion, larvæ will remain more or less stationary for long periods if water is regularly added.

Till recently the idea prevailed that hookworm larvæ had great powers of lateral diffusion from an infected focus. This is certainly not the case. The slight lateral migration detected in Colombo soil was easily accounted for by the mechanical action of the currents set up after addition of water to the soil. Observations in the West Indies lead to a similar conclusion. If the moisture content of the zone surrounding the infected fæces be artificially increased on a horizontal plane lateral migration will take place, but such conditions can seldom occur in the field.

Till recently many sanitarians considered that hookworm fæces could safely be buried under a shallow layer of earth without risk of the larvæ developing and ascending to the surface. Recent research shows that burial affords no such security, unless the soil is restrictive of larval movement.

Hookworm larvæ move upwards or downwards according to the amount of moisture present in the different levels of the ground; if the ground surface is drying they descend to moister levels; if the upper layers of the soil are moist they ascend till they reach the surface.

The extent of the vertical movements of hookworm larvæ appears to be governed principally by three factors:—

- (1) The size of the soil particles.
- (2) The distribution of the ground water.
- (3) The amount of energy stored up as food granules in the body of the larvæ.

Mature larvæ are usually provided with a sheath which protects them to some extent from adverse influences. After moving even a short distance through compact cabook the sheath is lost.

Loss of sheath is much less marked after passing through a light sandy soil of the Narahenpitiya type. Only 20 per cent. of the larvæ added to cabook can be recovered by Baermann's method, whereas more than 80 per cent. can be isolated from Narahenpitiya soil. Preliminary experiments were made in January and February, 1923, on the vertical powers of ascent of hookworm larvæ. Stools heavily infected with hookworm larvæ and the filariform larvæ of *Strongyloides stercoralis*, after mixing with earth, were buried at the bottom of pits dug in hard cabook near the laboratory to the depths of 6, 12, 18, and 36 inches.

The shallower pits were filled with coarse river sand, Narahenpitiya soil, and loose cabook. Both species of larvæ ascended 6 inches through all three soils, and hookworm larvæ 12 inches through each soil and through 18 and 30 inches of sand.

It was proposed to repeat these experiments with definite quantities of larvæ, but in the meantime Florence Payne in America has published a report of such experiments in which numerous larvæ were recovered after an ascent of 36 inches through sand. She found in her experiments that the larvæ were unable to penetrate white clay, but ascended 10 inches through a red clay.

The behaviour of hookworm larvæ in the surface of soil is of particular interest. Van Durme in 1902 drew attention to the remarkable attitude taken up by the filariform larvæ of *Strongyloides stercoralis* on the surface of particles of soil. Subsequently it was found by other observers that both human and canine larvæ behave in a similar manner. Larvæ attach themselves by one end to a particle of soil, preferably of fibrous nature, and extend themselves into the air. According to the writer's observations the motion of hookworm larvæ in this position is a slow to and fro wave movement as if continually reaching for a new support. The strongyloides larvæ exhibit a rapid jerky motion. Florence Payne reports that larvæ do not expend much energy in maintaining this position judging by the rate of disappearance of their food granules.

The larvæ may be observed to move from particle to particle on the surface by a species of looping motion. The aerial position is kept up for periods varying from a few minutes to half an hour or so at a time. Larvæ commonly cling together in aerial clusters which are readily visible to the naked eye on the surface of the soil. The surface of cultures of canine hookworm ova may be covered with waving plumes of larvæ.

The significance of this phenomenon seems clear. Perched in a favourable position on the surface of the soil the larvæ await their opportunity to come in contact with the human skin. So far as is known to the writer only infective nematode larvæ of the penetrative type behave in this manner. The free living soil nematodes, though often very active in their movements, remain in the interstices of the soil.

Immediately contact is made with the skin a new set of forces come into play leading to the penetration of the epidermis, the passage of the larvæ to the lungs, thence to the bronchi, trachea, and œsophagus. Full development takes place in the intestines, if the host is adopted to the species of the worm. *Necator ameracanus*, the Ceylon species of hookworm, has only two hosts, man and the gorilla. The series of forces which brings the larvæ on to the surface of ground moistened by rain, thence to the summit of the soil particles, or as high up as leaves and twigs as the moisture film extends, thence into the skin are analogous to the forces causing a plant to bend towards the light, or which drive a spermatozoa to its destination, the unfertilized ovum.

Pintner named the force thigmotropism which causes the larvæ to penetrate small pores. Brumpt has called the force driving larvæ into tissues histotropism. Khalil has recently described, under the name of thermotropism, the tendency of hookworm larvæ to move towards a heated point. The tendency of these larvæ to extend themselves into the atmosphere may be called ærotropism. It is sometimes difficult to separate hookworm larvæ present in soil, from the free-living forms having a somewhat similar appearance.

If a great variety of larvæ are recovered from a mass of soil the task of scrutinizing them all under the microscope in order to make an accurate count of the hookworm larvæ is often excessively laborious.

Progress in hookworm research work has been mainly a question of development in technique. It was Baermann's discovery in 1917 of a convenient and reasonably quantitative method for isolating nematode larvæ from soil which gave the impetus to modern research into the epidemiology of hookworm disease.

The writer has sought to facilitate the task of separating hookworm larvæ from free-living forms by taking advantage of the tropic reactions described above. It was found that hookworm larvæ will penetrate porous membranes, such as filter paper, chamois leather, or buckskin with great ease. Non-porous leathers, parchment, rubber, and similar substances are not penetrated. Larvæ penetrate into a membrane made of freshly dissected skin, but seldom pass through it.

The next step to bring a membrane retaining a suitable fluid at blood temperature in an inverted tube or vessel lightly into contact with the surface of soil containing larvæ. The aerially extended larvæ then pass upwards through the membrane into the fluid where they may readily be recovered free from soil particles and almost free from non-infective larvæ. The results are somewhat affected by the temperature of the atmosphere. It may be necessary to cool the under side of the receptacle containing the soil. A buckskin membrane was commonly used in these experiments.

A curious phenomenon was noted during these investigations (September, 1922, to January, 1923). If a pan of soil showing numerous aerially extended larvæ be placed in the incubator at 37° C. all the larvæ disappear from the surface of the soil. They re-appear in a few minutes at room temperature on the laboratory bench.

The technique can be adopted to any quantity of soil. A second test found of value is that of applying the suspected larvæ to the skin of a rat. If the suspected larvæ are able to reach the lung of the rat within three days with production of hæmorrhagic congestion of the organ, the result of the test is considered to be positive. Both canine and human hookworm larvæ give positive results to this test, provided sufficient numbers of larvæ are applied to the skin. Penetrative nematode larvæ of other species would doubtless give similar results. Free-living larvæ give negative results. Tests of this kind cannot entirely replace the crucial experiment of applying the larvæ to the human skin and expelling any hookworms developed, but enable such troublesome experiments to be reduced to a minimum.

52. *The Value of Insulin in Diabetes Mellitus—A Brief Survey of Seven Cases by Dr. Lionel de Silva, Physician, General Hospital, Colombo.*—The undue optimism and pessimism with regard to the value of insulin in the treatment of Diabetes Mellitus in Ceylon is I think a sufficient reason for this preliminary note.

A previous experience of a fair number of insulin cases in private practice provided me with the necessary impetus to attempt this treatment in seven cases which were in my wards more or less at the same time.

These remarks are based on the progress of these cases. Diabetes Mellitus is not regarded as a definite disease to-day, for it is only a name given to an easily recognized group of symptoms of complex etiology.

All these patients complained of these common symptoms, viz., Polyuria (excess of urine), Polydipsia (excessive thirst), Polyphagia (excessive appetite), and progressive wasting of varying degree. This well known group of symptoms which is aptly regarded by some observers as a definite "syndrome" is due to the excess of sugar in the blood.

Experience of numerous blood sugar determinations both in England and in Ceylon have led me to the following conclusions which will naturally be subject to modification with further knowledge and experience.

That although the physiological variations in the blood sugar, based on the experience of the West, range from .08 mgms. to .2 mgms. per cent. there is marked difference to be noted in the cases observed in the inhabitants of Ceylon. This difference seems to be based on a racial factor, which bears an important relation to the mode of living and the susceptibility of the nervous system of the various races. The average percentages of the sugar in the blood of the various races in Ceylon have been found as follows:—

Europeans: ranging from .08 mgms to .011 mgms. per cent.

Burghers who indulge in a mixed diet: ranging from .11 mgms to .13 mgms. per cent.

Sinhalese: ranging from .15 mgms. to .18 mgms. per cent.

Tamils: ranging from .15 mgms. to .19 mgms. per cent.

Muhammadans and other Indian races: ranging from .2 mgms. to .25 mgms. per cent.

Blood sugar determinations were made side by side with the urinary sugar determinations in the private cases referred to. Opinion is unanimous, regarding the fact that a single estimation of the percentage of sugar in the blood is very nearly useless. It is the behaviour of the blood sugar curve which determines the severity of the failure of carbohydrate metabolism and the dose of insulin given.

The method adopted necessitated a small quantity of blood sufficient to soak a piece of blotting paper half an inch square. The test was conducted in the following order.

First, as soon as the patient comes in after his customary meal taken two hours previous to the examination, a sample of blood is taken. This determines his normal percentage of sugar. The second sample is taken 30 minutes after the ingestion of 50 grammes of glucose. The third sample 60 minutes after, the fourth 90 minutes after, the fifth 120 minutes after. Five separate samples of urine were taken at the intervals above mentioned, and the sugar was estimated by Benedicts' method.

There was a marked similarity in the behaviour of the blood sugar curve and the urinary sugar curve in over seventy-five per cent. of the cases investigated.

This simple urinary test has so far been sufficiently accurate to justify its routine use and to supplement the more elaborate blood test, which, however, must be performed once at least in order to eliminate the possibility of the condition known as Renal Diabetes, &c. This urinary test has been termed by me the "urine tolerance test" for diabetes.

This was the test used in my ward cases in the manner already indicated before commencing insulin treatment. All the seven cases showed a severe type of the disease and gave the typical diabetic urinary sugar curves similar to those that were given in my previous cases, where combined estimates were done. The first step in my treatment was to withhold the administration of insulin and drugs

altogether, the patient being restricted solely to the dietetic treatment. Daily examinations of urine for the next few days showed a diminution on the average of about 20 per cent. of the quantity of sugar originally passed. The value of the carbohydrate diet was considerably under 50 grammes per diem. There was noticed a slight improvement in the symptoms. The urinary sugar output and the general condition remained unchanged at a constant level for the next few days. This clearly indicated that this treatment has had its maximum effect, and that something more had to be done in the way of treatment.

The second step in the treatment was now begun by the exhibition of drugs, while still continuing unchanged the previous line of dietetic treatment. Drugs were given to stimulate the liver functions and to relieve freely the constipation which is so frequently present in these cases. The result of this combined method brought about a well marked improvement, but the symptoms of glycosuria persisted to such a degree as to warrant further treatment.

Two of these cases suffered from some surgical complaint which needed operation, and two others had the grave complication of pulmonary tuberculosis which rendered the rapid reduction of the hyperglycæmia imperative.

Then I reached the indication for the third stage of the treatment. It is here that we realize the great boon that has been conferred on the diabetic by Banting and his co-workers. The urine tolerance test was again done before the insulin was administered, and it was noticed that the tolerance curve was still that of a severe diabetic. Although there was noticed slight improvement in the curve at this stage of the treatment, all the cases justified the use of insulin in 10 unit doses twice a day. The sugar in the urine was estimated twice a day, morning and evening.

The diet and medicines were continued in some cases, and in the others a more liberal diet was given, and the medicines withheld. In the cases where the combination of insulin, diet, and drugs were administered at the same time the improvement of the patients was remarkably rapid. The sugar in the urine disappeared entirely in one case by the fifth day and within 10 days in the other cases. An emaciated boy of 18, for example, gained nearly 20 lb. in weight within two months by this combined method of treatment.

In the cases above referred to, the administration of insulin was reduced to once a day only at the end of a fortnight. The diet was gradually increased, according to the individual requirements, and the drugs were gradually reduced till the patients passed a sugar free urine on a diet of the approximate value of 150 grammes of carbohydrate. When the insulin was finally withheld altogether there was a re-appearance of a little sugar in two of three of the cases. This, however, was readily adjusted by slightly diminishing the carbohydrate intake. As long as patients keep to a reasonable diet and take sufficient care of themselves there is no doubt that they can pursue their ordinary vocation like other people who are free from the disease. Such people can answer to those that desire to know—does insulin cure diabetes? Yes, it does cure the careful man.

The disease persisted for a longer time in the cases that were treated with insulin alone until the combined method was adopted, when equally satisfactory results were obtained.

After some time there were a few recurrences, and on investigation it was found that these patients had by various means taken three or four times more carbohydrate than their recently regained capacity permitted.

Diabetes have such a craving for carbohydrate foods that they seem unable to resist the temptation. These form the majority of the people who swell the ranks of the pessimists who fail to see the benefits of this valuable preparation. Optimists and opportunists do or do not want to see that at least fifty per cent. of the cases in Ceylon are amenable to ordinary treatment without insulin. This fact, however, does not minimize the value of one of the most important discoveries of this century.

53. *Splenectomy, by Dr. Catherine E. Anderson, Medical Officer in Charge, Lady Havelock Hospital for Women and Lady Ridgeway Hospital for Children, Colombo.*—Podina, aged 14 years, was admitted into the Lady Havelock Hospital from Kurunegala on May 2, 1923, with a history of having malaria and enlarged spleen. The spleen filled up nearly the whole of the abdomen, and the child was suffering from pressure symptoms, and was most uncomfortable. Splenectomy was performed on May 12, 1923. Morphia gr. $\frac{1}{2}$ with Atropine gr. $\frac{1}{100}$ was given hypodermically half an hour before the operation, and the anæsthetic employed was chloroform and ether.

No adhesions were present and a spleen weighing $4\frac{1}{2}$ lb. was removed through a vertical incision through the left rectus muscle without much difficulty and with scarcely any loss of blood. The patient made an uninterrupted recovery and was discharged quite well on June 7, 1923. She was seen 7 months later and was in the best of health.

Colombo, June 6, 1924.

G. J. RUTHERFORD,
Principal Civil Medical Officer and
Inspector-General of Hospitals.